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Sulphonamides in General Veterinary Practice

DISCUSSION BY THE CENTRAL VETERINARY SOCIETY*

The Experimental Basis of Sulphonamide Therapy

DR. GEORGE BROWNLEE (The Wellcome Physiological Research Laboratories, Beckenham): Domagk's (1935) observation that oral prontosil protected mice against a number of lethal doses of *Streptococcus pyogenes* was apparently a piece of fortuitous empiricism. This view does less than justice to the painstaking investigation of the long series of chrysoidine dyestuffs inaugurated alone by the I.G. Corporation. Following the demonstration by the Tréfouëls, Nitti and Bovet (1935) that the active material was sulphanilamide, fresh impetus was given to the problem by the observation of Woods (1940) that *para*-aminobenzoic acid was a specific antagonist of bacterial growth-inhibitions caused by sulphanilamide. The implication of this observation resulted in the direction of attention to the actual target within the organism at which chemotherapy was aimed, that is, its metabolic processes. As was the case with Domagk's discovery, so again in this case, progress was so rapid that there has been a tendency to underestimate the significance of the great achievements of the workers in very diverse fields whose fundamental studies made these advances possible. Although some aspects of the basic researches are not at first glance apparently related to the subject of the discussion, the various pieces fit together to make one concept of cell metabolism. It is proposed briefly to review the developments which brought the diverse fields together.

The present-day conception of cell metabolism has its origin in three distinct fields of research. These are *animal nutrition*, *bacterial nutrition* and the *nutrition of yeasts*. The three subjects advanced independently but concurrently and were finally unified by the impact of the discovery in the field of enzyme chemistry that the "yellow ferment" of Warburg contains as its prosthetic group, riboflavin, already recognised as a vitamin for man and an accessory growth factor for bacteria.

The study of animal nutrition may be said to have begun when early clinicians utilised liver in the treatment of night-blindness, or fresh fruits in the treatment of scurvy. Again, it was a clinician, Eijkman (1897) charged with the study of beri-beri, who observed beri-beri in his own hens fed on a diet of polished rice and who demonstrated that rice polishings cured the condition.

By 1912, Funk, at the Lister Institute, was able to refer to the known deficiency diseases as beri-beri and scurvy, and possibly rickets, pellagra and sprue. His own researches on beri-beri he carried to the preparation of a concentrate which he showed to be an amine and for which he proposed the generic name vitamin. His experimental animals were pigeons, in which polyneuritis was produced on the deficient diet tested.

It was left to Hopkins and his school to challenge the existing conception of nutrition and to build the systematic platform. Hopkins was able to show that in animal nutrition "accessory food factors" are required in addition to fats, carbohydrates and proteins, and demonstrated that rats on certain diets required a "soluble factor" from milk. He also showed the essential nature of at least one amino acid, tryptophane, for animal growth. (The essential amino acids are now known to be glycine, tryptophane, histidine, phenylalanine, leucine, isoleucine, threonine, methionine, valine and arginine.) Hopkins introduced the method of using average growth curves, a method which acquired great significance since it enabled vitamin A and the vitamin B complex to be conveniently measured without the need to produce specific symptoms characteristic of vitamin deficiency. Osborn and Mendel, and McCollum and Davies applied the growth method to rats and chicks in their pioneer studies on vitamin A and vitamin B complex.

The application of these methods resulted in the ultimate isolation of pure vitamins.

These plodding studies on the water soluble vitamins were given a great deal of impetus and were eventually over-run by the rapid progress made in a field which was not at first apparently related. namely, the study of bacterial nutrition. This latter study itself ran at first independently of the special study of the nutrition of yeasts. Among the reasons for the rapid progress made in these two fields is the fact that the micro-organisms which first attracted attention are among the most exacting of any living organisms from the point of view of nutritional requirements, also the tests employed commonly observed growth or no growth, and unlike the laborious vitamin assays are readily performed in large numbers.

The development of the study of the nutritional requirements of yeasts has been well reviewed by Williams (1943). The original observation of Wildiers (1901) that yeasts needed a substance called "bios" for complete nutrition, was responsible ultimately for the isolation of the "essential growth factors" (called "nutrilites" by Williams), inositol, pantothenic acid, and biotin. All three were afterwards found to be vitamins previously suspected for animals. The study of bacterial nutrition began with the problem of cultivation *in vitro* and it was not long before it was recognised that bacterial growth factors existed. Thus Twort and Ingram (1913) recognised that an active substance (since found to be a vitamin K analogue) synthesised by *Mycobacterum phlei* (timothy grass bacillus), was essential for the growth of *Mycobacterium para-tuberculosis* (Johne's bacillus), and ten years later progress in animal nutrition had advanced far enough to lead Fildes (1923) to name the growth factors of *Haemophilus influenzae*, the X, and V (or vitamin) factors. The V factor has since been found to be replaceable by cozymase from yeast or coenzyme from red blood cells (Lwoff and Lwoff (1937)) but not by nicotinic acid or its amide. These two coenzymes consist of nicotinic acid amide, adenine, a pentose and phosphoric acid. They differ only in the number of phosphoric acid molecules.

Almost as soon as the water soluble vitamins became available in a pure form their common nutritional function in a number of organisms was discovered. Thus, thiamin, vitamin B_1, for animals was shown to be an essential growth factor for a mould, *Phycomyces blakesleeanus* (Schopfer (1934)), and a growth promoter for lactic acid and propionic acid bacteria (Tatum, Wood and Peterson (1936). Since then an increasing number of essential growth factors has been recognised and the idea of their universal metabolic character began to take shape. The greatest single unifying factor in this conception of a universal metabolic process was the discovery in the field of enzyme chemistry by Warburg and Christian (1932) that the "yellow ferment" contains as its prosthetic group, riboflavin, already recognised as a vitamin for man and an accessory growth factor for bacteria. The realisation that these apparently unrelated substances were common to the biochemical processes of life was brought sharply into focus by the opportune demonstration due to Woods (1940) that the antibiotic *para*-aminobenzenesulphonamide interfered with the utilisation of *para*-aminobenzoic acid in the life processes of living cells.

The growth requirements and the complementary nature of the studies is set out in Table I (*overleaf*), which has been adapted from a table by Knight (1945), from whose review the following is quoted:

> "It will be seen that the substances tested in Table I fall into several groups. Thus in Group A, thiamin, riboflavin and pyridoxin were compounds new to chemistry which were first discovered as a result of their biological activity observed in the nutrition of higher animals. Group B substances were known to organic chemistry and had been isolated from biological materials before their roles in the nutrition of micro-organisms were observed or indeed before any special physiological functions for them were known. Group C, pantothenic acid and biotin, were, like Group A, new to chemistry but were first detected through their biological activities in the growth requirement of a micro-organism, yeast. *Para*-aminobenzoic acid is at present in a class by itself in that it is the first compound whose hitherto unsuspected biological activity was discovered, not directly as a growth substance, but indirectly through its neutralisation of an artificial growth inhibition which was interfering, as it now appears, with an essential metabolic reaction. Biotin, whose effect in animal nutrition was first discovered through the effect of a natural inhibitor, avidin, was independently found as a growth factor for micro-organisms before its effect in animal nutrition was clearly recognised."

We have seen how the study of the growth of micro-organisms first of all focused attention on nutritional requirements and only much later on the equally important study of the synthetic ability of the cell itself. As these studies developed, it was realised that certain dietary constituents, some of them vitamins some nutrilites, some essential growth factors, fulfilled a common metabolic function in the higher animals and micro-organisms, being used directly in the metabolic processes or as part of the enzyme systems carrying on the processes.

This was the experimental background which enabled Fildes

* At the meeting held at the Conway Hall, London, W.C.1, February 1st, 1945.

Table I

Substance	First Recognised as an Essential Nutrient for	Subsequently Implicated in the Nutrition of	Component of Enzyme Systems, etc.
A—			
Thiamin (vitamin B_1)	Higher animals	Bacteria, lower fungi, protozoa, roots of higher plants	Co-carboxylase thiamin protein enzymes
Riboflavin (vitamin B_2)	„ „	Bacteria, insects, lower fungi	Several flavo protein enzymes
Pyridoxin (vitamin B_6)	„ „	Bacteria, insects, lower fungi, plant roots	Co-enzyme of tyrosine decarboxylase
Methyl-naphthaquinone types (vitamin K)	„ „	Mycobacteria species	—
B—			
Nicotinic acid ..	*Staph. aureus*	Higher animals, plant roots	Co-enzymes I and II pyridine—protein enzymes
Pyridine, nucleotides	*Haemophilus influenziae*	—	—
Uracil	*Staph. aureus* (anaerobic)	—	—
Glutamine ..	Streptococci	—	—
Pimelic acid ..	*C. diphtheriae*	—	? Role in biotin biosynthesis
Inositol	Yeasts	Mouse, mould	—
β-alanine	„	*C. diphtheriae*	Part of pantothenic acid
C—			
Pantothenic acid ..	„	—	—
Biotin	„	Bacteria, higher animals, insects, lower fungi	— —
D—			
Para-aminobenzoic acid	Bacteria	Higher animals, insects, lower fungi	?Para-aminobenzoyl-glutamic acid, polypeptide

(1940) to pose the generalisation that antibacterial substances could be designed deliberately to interfere with the metabolism of the parasite by designing an inhibitor with a chemical structure sufficiently close to and sufficiently different from an essential metabolite of the cell.

The chemical variants of *para*-aminobenzenesulphonamide which have passed into use by reason of an increased range of activity, namely, sulphapyridine, sulphathiazole and sulphadiazine, owe their activity primarily to their interference with the *para*-aminobenzoic acid coenzyme system. Their differences are quantitative and have been explained on a basis of chemical structure and dissociation. In fact, in the case of the more complex molecule—sulphadiazine—the effect is to make the sulphanilyl end of the drug more like the *para*-aminobenzoic acid molecule than the apparently simpler sulphanilamide (Roblin and Bell (1942); Kumler and Daniels (1943)).

This reason probably underlies the experimental finding that the range of action of sulphanilyl drugs on pathogens is quantitative and not qualitative; there is no "specificity of action." For example, sulphanilamide is active chemotherapeutically against strains of streptococci, sulphapyridine against streptococci, pneumococci and pasteurella, sulphathiazole against streptococci, pneumococci, pasteurella and staphylococci; sulphadiazine is similar to sulphathiazole in its range of action but is quantitatively more efficient. Since the specific inhibition of bacterial growth by sulphanilyl drugs can be antagonised by *para*-aminobenzoic acid the quantitative relation of sulphanilyl drugs can be shown in terms of the ratios of *para*-aminobenzoic acid required to antagonise sulphanilyl drugs *in vitro*.

In tests carried out in this laboratory with *S. pyogenes* P90, the ratio of *para*-aminobenzoic acid to drug was found to be 1:23,000 for sulphanilamide, 1:17,000 for sulphapyridine, 1:8,000 for sulphathiazole, and 1:7,000 for diaminodiphenylsulphone.

This experimental observation may explain certain types of species differences and even individual differences to chemotherapy with sulphonamide drugs since the antibiotic in this particular case is now known to be a vitamin in animal metabolism.

Conditions for Successful Chemotherapy

The condition for successful chemotherapy may be enumerated as the maintenance for a period longer than the growth phase of the organism of a bacteriostatic concentration in the tissue (blood, cerebrospinal fluid, lymph, synovial fluid, milk, etc.), from which the parasite derives its essential metabolites. A second inference, well established by experience, is that the necessary concentration should be rapidly achieved, held without remission and then discontinued. A third inference is that since these drugs are true antibiotics they are not therapeutic agents and during their period of use are, to some extent, toxic.

The danger of inadequate dosage is extreme in the case of bacteria where metabolic adaptibility is so high that drug resistant strains can be produced in a few generations and adaptability is closely related to the power of synthesis of the cell. This point may be demonstrated experimentally.

With respect to the biotics other than *para*-aminobenzoic acid it must be asked whether it has been possible to prepare antibiotics which are antibacterial. As we shall see, the theory has been crowned with practical achievement. Bacteria which require pantothenic acid are inhibited by pantoyltaurine, the sulphonamide analogue of pantothenic acid; the inhibition is reversed by pantothenic acid (Snell (1941); McIlwain (1942); Barnet and Robinson (1942)). Pyridine-3-sulphonic acid or its amide inhibits certain bacteria which require nicotinic acid (pyridine-3-carboxylic acid), the inhibition being reversed by nicotinic acid or its amide (McIlwain (1940)). Pyrithiamin, in which the thiazole ring of thiamin is altered to a pyridine ring, showed inhibitory effects which were reversed by thiamin (Wooley and White (1943)). In the same way has been shown the inhibitory effect of the α-amino-sulphonic acid analogues of certain simple α-amino-carboxylic acids (glycine, alanine, etc.) required as nutrients by some bacteria (McIlwain (1941)).

When are Antibiotics Chemotherapeutic?

The theoretical expectation that an antibiotic based on a corresponding biotic (essential metabolite) may prove to be chemotherapeutic may be said to depend on the relative concentration and utilisation of the biotic by parasite and host. Where the needs for an essential metabolite (vitamin) by the host are low and the utilisation of the essential metabolite (biotic) by the parasite is high, chemotherapy with the corresponding antibiotic is likely to be successful; conversely where the utilisation by the host is high and the needs of a parasite are low, chemotherapy is unlikely to be successful.

This assumption may explain the extreme success of the antibiotic, sulphanilamide, and the assumption is itself illuminated by the observations made by McIlwain and Hawking (1943) with pantoyltaurine. They were able to protect rats but not mice against lethal doses of *Streptococcus pyogenes* and the explanation was found in the higher concentration of pantothenic acid in mouse blood. Thus, in rats, but not in mice, the ratio of pantoyltaurine to pantothenate was high enough to bring about bacteriostasis.

It is only necessary to sub-culture from a medium containing less than bacteriostatic concentrations of the drug (McIlwain (1943)) in order to obtain resistant strains. Subsequently the concentration of drug needed to inhibit the organisms is now much higher than the possible therapeutic range which may be achieved in treatment. The subculture process may be continued until a stage is reached at which the organisms are rendered drug-fast. A strain which has been made resistant to one sulphanilyl drug will be resistant to other members if the resistance is due to having acquired a greater power to synthesise *para*-aminobenzoic acid. A point of practical importance arises here. The quantitative relation which exists between members of the sulphanilyl series makes it possible to treat effectively with a more active drug cases resistant to a less active drug.

Reference has already been made to another potential cause of strain resistance which originates in the common metabolic function of *para*-aminobenzoic acid in the parasite and the host. In the presence of an avitaminosis due to *para*-aminobenzoic acid, the parasite is passaged under subnutritional conditions strictly analogous to the experimental case quoted above. The surviving parasite of necessity acquires the facility to survive without an external source of *para*-aminobenzoic acid and thus is resistant or even fast to sulphonamide therapy. Strains of this kind have been described by Harkness, who recovered *N. gonorrhoeae* from couples, and of presumed common source, where one strain was resistant and the other not, a difference which he ascribed to the different nutritional environments of the parasite, summed up in the term "host factor."

In the same category must be assumed to be the strains of resistant pathogens arising in animals which have not met sulphanilyl drugs. A good example is given by strains of *E. coli* recovered from fatal cases of confirmed "Calf Scour." It is tempting in this case to relate the external nutritional environment of the organism to the sulphanilyl resistance of the strains. (Table 2.)

The demonstration of successful chemotherapy in a pathology of bacterial origin by clinical trial demands closer examination than that of apparent clinical recovery. A new chemotherapeutic postulate is needed; in addition to clinical recovery it is desirable to recover the parasite, to identify it following culture, to demonstrate its susceptibility to the chemotherapeutic agent concerned, and if possible to produce a pathology in an experimental animal and to

show that this pathology is amenable to systematic chemotherapy. This may sound like a doctrine of perfection; the minimum requirement is that the causative parasite be shown to be susceptible to a known concentration of the chemotherapeutic agent in an appropriate medium.

TABLE II

THE RELATIVE EFFICIENCY OF SULPHANILYL DRUGS AGAINST STRAINS OF *E. coli* FROM FATAL CASES OF "WHITE SCOUR" IN CALVES

Coli	S.B.	S.A.	S.G.	S.A.B.	S.P.	S.T.
700	90	1	0	0	9	90,000
Patella ..	100	10	1	10	10	10,000
795/2 ..	7,000	70	70	0	70	7,000
508	650	6	6	6	65	650,000
G. Williamson	750	7	1	1	75	750,000
S.B.	8,000	8	80	80	80	80,000
840/4 ..	75	1	0	1	—	75,000
Daywell ..	• 550	550	55	5	—	55,000
Barrow ..	7,000	7	7	70	—	70,000
Fleming ..	6,000	60	60	60	—	60,000 or +
Benbow ..	500	50	50	50	—	50,000 or +
Walls 2 ..	2,200	2	2	0	22	22,000
Whitby ..	40	1	1	0	4	40,000
Watts I ..	80	8	8	1	8	8,000
840/8 ..	75	7	0	0	75	75,000
Holmes ..	• 20,000	20	200	20	2,000	200,000
Whitby ..	50	5	0	0	50	50,000
S. Pellman ..	7,000	70	7	70	—	70,000
Whitby H.B.	10	10	0	1	1	0
Nicholls ..	70	7	7	1	70	7,000
853	8,000	80	8	8	80	8,000
Bruford ..	100	1	1	0	10	10,000
Coli 5 ..	1	1	1	6	1	60,000
Gordon 3 ..	45,000	4	0	4	50	4,500
Gordon 1 ..	7	7	0	1	—	7,000
Gordon 2 ..	700	7	0	0	—	70,000
Gordon 4 ..	50	5	5	5	50	50,000
Calf 3 ..	1,000	10	0	0	10	1,000,000
Calf 5 ..	1,000	0	0	0	0	10,000
Control Strains						
E. coli 15 ..	2,500	0	25	25,000	2,500	2,500,000
S. dysenteriae	200,000	—	2,000	20,000	2,000	—

S.B. = Sulphabenzamide. S.A.B. = Sulphamidobenzamide.
A.A. = Sulphanilamide. S.P. = Sulphapyridine.
S.G. = Sulphaguanidine. S.T. = Sulphathiazole.

The table shows the comparative efficiency of various sulphanilyl drugs in inhibiting the growth of strains of *E. coli* isolated from fatal cases of "white scour" in calves. All the drugs were assayed at a concentration of 200 mg. per 100 ml. of Wright's Broth, with a serially diluted inoculum of organisms, the numbers of organisms inhibited after 18 hours at 37°C. were calculated from roll counts of control tubes. Considerable information is given by such a test. For example it is seen that all strains except two (•) may be considered to be resistant to sulphanilamide, sulphaguanidine, sulphamidobenzamide and sulphapyridine, while sulphabenzamide is quite effective and sulphathiazole highly effective. It was deduced from these results that sulphaguanidine was likely to prove ineffective in the treatment of "white scour" associated with *E. coli* of this type, while derivatives of sulphathiazole (*e.g.* succinylsulphathiazole, etc.) were likely to be of value.

Table 2 illustrates the sort of information which such a simple test may be expected to yield. The comparative efficiency of various sulphanilyl drugs in the growth of strains of *E. coli* isolated from fatal cases of "White Scour" in calves is shown. All the strains except two may be considered to be resistant to sulphanilamide, sulphaguanidine, sulphamidobenzamide and sulphapyridine, while sulphabenzamide is quite effective and sulphathiazole highly effective. It was deduced from these results that sulphaguanidine was likely to prove ineffective in the treatment of "White Scour" associated with *E. coli* of this type, while derivatives of sulphathiazole (*e.g.*, succinyl-sulphathiazole) were likely to be effective.

In selecting the medium due regard should be paid to the locus of infection, *e.g.*, blood-borne pathogens should be assayed in blood, milk-borne pathogens in milk.

A good example of the pitfalls besetting the unwary is provided by the example of the action of drugs on Type B streptococci, in this case *S. agalactiae*. Tested against falling concentrations of drugs in Wright's Broth with a constant inoculum of organism, strains of *S. agalactiae* are resistant to the antibacterial action of sulphanilyl drugs, but susceptible to the action of benzylamine-4-sulphonamide or penicillin. However, tested in the same way in freshly drawn autoclaved milk, the strains are completely susceptible to sulphanilyl drugs and not quite so susceptible to the action of benzylamine-4-sulphonamide and just as susceptible to penicillin (Table 3).

TABLE III

THE INFLUENCE OF MEDIA ON THE RESISTANCE OF *S. agalactiae* TO DRUGS

Strains of *S. agalactiae*	Tested in Wright's Broth				
	S.A.	S.D.	S.T.	B.S.	PEN. Units per 100 ml.
10	1 : 200	1 : 400	1 : 400	1 : 6,400	12
Adamson 10	"	"	"	"	"
12	"	1 : 1,600	1 : 1,600	"	"
13	Fast	Fast	Fast	1 : 800	"
14	"	"	"	"	"
Alexander 15	• 1 : 3,200	1 : 3,200	1 : 3,200	"	"
19	1 : 200	1 : 400	1 : 400	"	25
21	"	"	"	"	"
23	"	"	1 : 800	1 : 12,800	12
M.D.40 ..	• 1 : 800	1 : 3,200	1 : 3,200	"	25
M.E.50 ..	1 : 200	1 : 400	1 : 800	"	12
M.F.56 ..	"	"	"	"	"
79	"	"	"	"	"
88	"	"	"	1 : 3,200	6
237	"	"	"	"	12
33	"	"	1 : 400	1 : 1,600	"

Strains of *S. agalactiae*	Tested in Fresh Milk, Autoclaved				
	S.A.	S.D.	S.T.	B.S.	PEN. Units per 100 ml.
13	Fast	Fast	Fast	1 : 200	12
88	> 1 : 51,200	> 1 : 51,200	> 1 : 51,200	1 : 1,600	6
33	1 : 51,200	1 : 51,200	> 1 : 51,200	1 : 800	12
10	1 : 21,600	1 : 51,200	1 : 51,200	1 : 3,200	"
Adamson 10	1 : 6,400	1 : 51,200	1 : 51,200	1 : 3,200	"
12	1 : 25,600	> 1 : 102,400	> 1 : 102,400	1 : 3,200	6
13	Fast	Fast	Fast	1 : 200	12
14	1 : 12,800	1 : 51,200	1 : 102,400	1 : 400	"
Alexander 15	1 : 25,600	1 : 51,200	1 : 51,200	1 : 1,600	"
19	1 : 15,600	1 : 51,200	1 : 51,200	1 : 1,600	"
19	1 : 15,600	1 : 51,200	1 : 51,200	1 : 1,600	"
	1 : 25,600	1 : 51,200	1 : 51,200	1 : 800	"
23	1 : 12,800	1 : 102,400	1 : 102,400	1 : 6,400	"
M.D.40 ..	1 : 25,600	1 : 102,400	1 : 51,200	1 : 3,200	"
M.E.50 ..	1 : 6,400	1 : 12,800	1 : 25,600	1 : 1,600	"
M.F.56 ..	1 : 12,800	1 : 51,200	1 : 25,600	1 : 3,200	6
79	1 : 25,600	> 1 : 102,400	> 1 : 102,400	1 : 1,600	"
88	> 1 : 51,200	> 1 : 51,200	> 1 : 51,200	1 : 1,600	"
237	1 : 12,800	1 : 51,200	1 : 51,200	1 : 800	"
33	1 : 51,200	1 : 51,200	> 1 : 51,200	1 : 800	12

S.A. = Sulphanilamide. S.T. = Sulphathiazole.
S.D. = Sulphadiazine. B.S. = Benzylamine-4-sulphonamide.
PEN. = Sodium penicillin.

The table shows the influence of the medium on the interpretation of the resistance of *S. agalactiae* to sulphanilyl drugs, benzylamine-4-sulphonamide and penicillin. The media in each case contained a constant inoculum of organisms and serial dilutions of 200 mg. per 100 ml. of drugs, readings being taken after two days at 37°C. A comparison is made between the concentrations of drug which inhibit growth. The strains in broth are shown to be very resistant, with two exceptions (•), to sulphanilyl drugs, while in fresh autoclaved milk the strains are found to be susceptible to sulphanilyl drugs. Benzylamine-4-sulphonamide is slightly more active in broth than milk, while penicillin behaves similarly in both.

The explanation for the extraordinary difference between the antibacterial efficiency of sulphanilyl drugs when assayed in Wright's broth and in milk is probably to be found in the widely different *p*-aminobenzoic acid content of the two media. Fresh milk contains virtually none (0·005 μg./per ml.) while Wright's broth contains 20 to 50 times as much.

The observations made in the latter test fit the observed clinical facts and from this point of view it is the test in freshly drawn milk which is important. The table also furnishes evidence of three distinct modes of action of the three types of antibacterial drugs.

Finally, a passing reference may be made to a newcomer mentioned here. Benzylamine-4-sulphonamide is an antibiotic for which the biotic is as yet unknown. It is not a sulphanilyl drug, that is to say, is not reversed by *para*-aminobenzoic acid, nor by *para*-aminomethylbenzoic acid, aminophenylacetic acid, aminocaproic acid, phenylalanine-carboxylic acid, nor indeed by any known biotic.

It has an interesting range of local action which includes streptococci, staphylococci and the anaerobes, it has some action against pyocyaneus; it has no systemic activity. There may be a veterinary future for its salts as a local depot dressing in field surgery and in emergency surgery, since they have a wider range than the sulphonamides at present used for this purpose.

REFERENCES

BARNET, J., and ROBINSON, F. A. (1942.) *Biochem. J.*, **36**, 364.
DOMAGK, G. (1935.) *Dtsch. med. Wschr.*, **21**, 829.
EIJKMAN. (1897.) *Virchows Arch.*, **149**, 187.
FILDES, P. (1923.) *Brit. J. exp. Path.*, **3**, 210.
———. (1940.) *Lancet* (i), 955.

FUNK, C. (1912.) *J. State Med.*, **20**, 341.
HARKNESS, A. H. (1944.) *Brit. J. vener. Dis.*, **20**, 2.
KNIGHT, B. C. J. G. (1945.) Vitamins and Hormones. Vol. 3. Academic Press, Inc. (in the press).
KUMLER, W. D., and DANIELS, T. C. (1943.) *J. Amer. chem. Soc.*, **65**, 2190.
LWOFF, A., and LWOFF, M. (1937.) *Proc. Roy. Soc.*, **122**, 360.
MCILWAIN, H. (1940.) *Brit. J. exp. Path.*, **21**, 136.
———. (1941.) *Ibid.*
———. (1942.) *Ibid*
———. (1943.) *Biochem. J.*, **37**, 265.
——— and HAWKING, F. (1943.) *Lancet* (i), 449.
ROBLIN, JR., R. D., and BELL, P. H. (1942.) *J. Amer. chem. Soc.*, **64**, 2905.
SCHOPFER, W. H. (1934.) *Arch. Mikrobiol.*, **5**, 511.
SNELL, E. E. (1941.) *J. biol. Chem.*, **139**, 975.
TATUM, E. L., WOOD, H. G., and PETERSON, W. H. (1936.) *Biochem. J.*, **30**, 1898.
TREFOUEL, J. and Mme., NITTI, F., and BOVET, D. (1935.) *C.R. Soc. de biol.*, **120**, 756.
TWORT, F. W., and INGRAM, G. L. T. (1913.) "A monograph on Johne's Disease."
WARBURG, O., and CHRISTIAN, W. (1932.) *Biochem. J.*, **254**, 438.
WILDIERS, E. (1901.) *La cellule*, **18**, 313.
WILLIAMS, R. J. (1943.) *Ann. Rev. Biochem.*, **12**, 305.
WOODS, D. D. (1940.) *Brit. J. exp. Path.*, **21**, 74.
WOOLEY, D. W., and WHITE, A. G. C. (1943.) *J. exp. Med.*, **78**, 489.

Mr. E. P. BARRETT (Guildford): My contribution deals solely with my own clinical experience, and does not attempt to cover reports from other sources. This means, of course, that there will be wide gaps which I hope will be adequately filled in during the ensuing discussion.

THE BOVINE

In reviewing the use of sulphonamides in veterinary practice, one's mind inevitably flies to their use in bovine mastitis. Sulphanilamide is the drug that has been most commonly used, and there are few practitioners who have not by now considerable experience of its benefits, as well as its shortcomings. It is well known that in the treatment of streptococcal mastitis with this drug, bacteriological cure occurs in relatively few cases, but that a high percentage show clinical recovery with rapid return to marketable milk. This has proved of very considerable benefit to the milk producers of the country. It is, however, important that they should understand that a treated and recovered cow may, and usually does, remain infectious to other milch cattle, and that proper precautions to prevent spread of infection should be taken. Some of these recovered cows relapse during the same or future lactations, but usually respond to further treatment. The importance of reasonably accurate and sufficient dosage has been well emphasised by Dr. Stableforth [*Vet. Rec.* (1945.) **57.** 1, 3-6.]

I understand that in some parts of the country the response of acute streptococcal mastitis to treatment with sulphanilamide is very disappointing. This, fortunately, has not been my general experience. I recall one herd in Warwickshire, however, in which infection was widespread, and in which, after a number of cases had been treated, the owner reported that sulphanilamide did not influence the condition at all. Improved cowshed hygiene and infusion of quarters, when dry, with euflavine 1:10,000, produced a satisfactory result.

One finds that the best response to sulphanilamide is given by a cow running a high temperature, 104 to 105°, and with gross changes in the udder secretion.

In my experience sulphanilamide *per os* is quite ineffective in subacute cases of mastitis in which one finds floccules in milk of otherwise normal appearance. These usually appear in the foremilk, but may be found throughout the secretion from one or more quarters. Neither have I found dosage *per os* combined with ten to 15 minute irrigation with euflavine 1:10,000 any more effective. For such cases I have been using sulphanilamide L.S.F. with encouraging results. The affected quarter is milked out, 50 c.c. of the solution at blood heat is injected into the quarter, and the gland massaged gently for a few minutes. The quarter is milked out eight hours later. In the majority of cases so treated, floccules have disappeared from the milk within a day or two of treatment. Of 23 animals treated in this way, most of them in one quarter only, 18 have made complete clinical recovery, and continued to give normal milk for the remainder of the lactation, several months in most cases. These figures are, of course, founded not on personal observation of results, but on reports from owners. I have been to some trouble to elicit adverse comment, usually not difficult to obtain, but without success, except in those cases mentioned. One only of the recovered cows was given two treatments at an interval of eight days. Of the failures, one cow was treated, first with euflavine 1:10,000 for ten minutes. As there was no improvement, L.S.F. was injected twelve days later, to be followed by temporary improvement. She relapsed, however, and went dry.

In one herd I had no success whatever with this method. I was asked to treat three cases of the subacute type. Two cows were affected in two quarters each, the other in one quarter. A laboratory report on samples taken from two of these cows stated the infecting organism to be a streptococcus which did not fall into any of the usual groups. Infusion with LSF was carried out as described, but with no improvement. Infusion with euflavine 1:10,000 was equally unsuccessful. A further sample was taken from two of these cows, one of them having been previously sampled. These two samples were found to contain *Streptococcus agalactiae* in large numbers. All these cows went dry on the affected and treated quarters, and were sent to slaughter. I have not been asked to treat any further cases of mastitis in this herd.

A case of mastitis in one quarter of a freshly calved heifer, caused by *Corynebacterium pyogenes*, may be of interest. The animal had a temperature of 105° F., and secretion was watery and floccular, but the typical foul smell usually associated with the secretion in this type of mastitis was not observed. The case was attended on the first day of illness, and diagnosed by a microscopic examination of secretion. Sulphapyridine, 60 grammes, was given at once *per os*, followed by 30 grammes three times daily for three days. The secretion returned to normal in both consistency and quantity on the second day. There was a relapse with the exhibition of similar symptoms a month or so later, but the treatment was repeated with a similar result, and the animal had no further trouble during the lactation. In a number of other cases, however, this treatment proved quite ineffective, apparently not influencing the course of the disease in any way. In none of these was treatment commenced as early as in the case described. The cost, of course, is very high and can be justified only if there is a reasonable hope of complete recovery with return to normal milk.

I think I am not exceptional in meeting cases of pyrexia of unknown origin in dairy cattle. The following is a typical case:—

Shorthorn cow calved one month—giving 31 lb. of milk daily.
May 13th, 1944. Sudden loss of appetite, milk yield fallen to about 5 lb.
May 15th. Called in to see this cow. Temperature 107° F. No appetite, milk yield negligible, accelerated breathing. Prescribed sodii. sal. and sodii. bicarb. aa ʒ ss b.i.d.
May 16th. Temperature 105° F. Milk yield 14½ lb. Still no appetite.
May 17th. No further change. Initial dose of sulphanilamide, 3 oz., given as drench, followed by the usual subsequent dosage. In two days the temperature was normal, appetite had returned and the milk yield was increasing.
May 23rd. Milk yield 29 lb.
June 6th. Milk yield 31 lb.

Another cow in the same herd exhibited similar symptoms a week or so later, was given a course of sulphanilamide immediately, and returned to normal in two days.

One should be careful not to confuse this type of case with one of acute pulmonary tuberculosis occurring in a cow in good condition within a few weeks of calving. In such a case there is usually a temperature of 105 to 107° F., accelerated respirations, coughing, usually without voiding sputum, abnormally bright expression and frequently little or no loss of appetite. In such case, of course, sulphonamides are of no avail.

Following difficult parturition in the cow, associated with gross manual or instrumental interference, the application of sulphanilamide suspended in water, cod-liver oil, or in a paste with a soap base, helps greatly to reduce the development of sepsis. It is advisable to repeat the treatment daily or every other day for the first five days. This treatment must, of course, be combined with syphonage of accumulated fluids.

In severe laceration of the vagina, when the danger of development of a fatal cellulitis is well recognised, the application of sulphanilamide as a local dressing, combined with the administration of stilboestrol dipropionate intramuscularly, has largely removed the fear of a fatal termination.

One occasionally meets a case, associated with retention of foetal membranes, in which there is an elevated temperature of 103 to 105° F., appetite completely lost, dry vaginal mucosa with a tendency to necrosis, foetal membranes disintegrating and spongy and sometimes sponginess of the uterine mucosa. This condition is apparently due to gas forming organisms of the clostridium type. Sulphonamides are of no avail, and the termination is, in my experience, invariably fatal.

A case of some interest was that of a shorthorn cow bought in freshly calved in June, 1944. She was artificially inseminated on September 27th. On December 20th, twelve weeks later, she was seen to be bulling and was inseminated again. On December 22nd her milk yield suddenly fell from 30 lb. to practically nothing, and appetite was lost; temperature 107° F. On the 23rd, temperature still 107° F.; rectal examination suggested a three

months' pregnancy in the left uterine horn. A course of sulphanilamide was commenced; temperature fell rapidly to normal, and the milk yield rose to 15 lb. On December 27th some discharge was passing from the vagina. On rectal examination no corpus luteum could be palpated in the left ovary, and one suspected that the condition might be a pyometra, from which an acute septicaemia was precipitated, as a result of disturbances by the insemination on December 20th. On January 5th the condition of the uterus was unchanged. Stilboestrol 25 mgm. was given intramuscularly, and a sample of discharge sent to a laboratory. Three days later, a considerable quantity of pus having been voided, palpation of the uterus revealed a great reduction in the size of the left horn, in which a mass of foetal bones could be felt. The owner decided to dispose of this animal as further treatment was unlikely to prove of economic value. The laboratory report was that streptococci, staphylococci and *B. coli* were isolated from the sample of discharge.

The Horse

In the horse the causal organism of non-specific febrile conditions appears in most cases to be susceptible to sulphanilamide. Whereas the cow is an easy animal to drench, and accurate dosage can be obtained by this means, this is not so, as a general rule, with the horse, and I strongly recommend the use of the stomach tube for the administration of the initial dose. The smaller supporting doses can be given as a drench or electuary, though with the return of appetite usually following soon after the commencement of treatment, most horses will eat the drug in a mash.

I have found sulphanilamide useful in the treatment of strangles, with an early fall of temperature and rapid development of the septic foci, thus hastening the process of ultimate resolution.

I have used it with satisfactory results in the treatment of infection of castration wounds, combined, of course, with proper drainage; and in metritis, combined with syphoning and local treatment.

On December 4th, 1942, I was called to a pregnant mare that was off colour and had stopped feeding. Her temperature was 105° F. The left side of the udder was tense, swollen and painful, and giving a scanty, floccular, watery secretion. There was no sign of trauma, and the origin of the condition was not apparent. Streptococci were demonstrated under the microscope. Four ounces of sulphanilamide were given by stomach tube and followed by 1 oz. three times daily. Temperature fell quickly and the udder returned to normal in a few days. At full term the mare delivered twin foals, one of which was dead, and the other died a few hours after birth. The udder, however, appeared normal. She foaled again in 1944, and suckled the foal, the milk yield being equal on both sides of the udder.

Treatment of Wounds

With the topical application of sulphanilamide, an accidental wound, of not more than eight to twelve hours' standing, is sutured with great confidence of obtaining first intention healing. This is the case even when there is considerable contamination and damage extending even to the periosteum. In small animals all grossly contaminated and lacerated tissue is removed under general anaesthesia and the cavity well dressed with sulphanilamide and the skin sutured.

Probably one of the most spectacular cases I have seen was that of a sheep dog with a tear of the skin extending two-thirds round the mid-femoral region, with sagging of the skin below the stifle. Anaesthesia was induced with nembutal intravenously. The wound was cleansed of gross contamination by débridement and mopping with dry boiled swabs. The whole exposed area was dusted with sulphanilamide and the skin was then drawn up and sutured. Bandaging was, as is usual in this area, difficult, and mainly ineffectual. There was no attempt by the patient to interfere with the wound, and when the sutures were removed on the seventh day, first intention healing had occurred.

The difficulty of achieving absolute asepsis in veterinary operations on the farm, and even under conditions usually existent in the surgery of the general practitioner, needs no repeating. Here, again, sulphanilamide has come to the rescue. In my experience, whereas stitch abscesses were by no means uncommon, and even complete breakdown of the operation wound occasionally occurred, since I have consistently dusted sulphanilamide between the muscle and skin sutures, I have come to expect first intention healing. I also make a practice of dusting sulphanilamide into the peritoneal cavity where there has been prolonged manipulation.

A case of some interest was that of a cat which had run a thorn diagonally into the cornea of the eye and broken it off flush with the external surface. The thorn was easily visible, but appeared to be causing the cat no discomfort whatsoever. Anaesthesia was induced with nembutal intravenously. The eye was thoroughly irrigated with normal saline. The removal of the thorn from the tough cornea proved extremely difficult; finally, with a knife, removal was effected, but the anterior chamber was opened and it collapsed. A few drops of atropine sulphate solution (2 gr. in 1 oz.) were instilled into the eye. The eyeball was dusted over with sulphanilamide and the eyelids sutured together. A suspension of sulphanilamide in cod-liver oil was applied twice daily to the line of sutures. When these were removed five days later the corneal wound had closed and was hardly visible. The eye in other respects was quite normal.

There is one operation wound that has proved, in my hands, an exception to the rule, and that is the flank wound in rumenotomy for the removal of foreign bodies from the reticulum, or relief of impaction of the rumen. In these cases, despite the liberal dusting of the wound with sulphanilamide before and after suturing, I have always had trouble with necrosis and sloughing of the muscle and connective tissue.

There appear to be at least two contributory causes of this. First there is more or less soiling of the tissues with ingesta from the rumen with which gas forming organisms of the clostridium type appear to be associated; secondly, there is the presence in the tissues of considerable quantities of local anaesthetic of the procaine type [Stableforth. (1945.) *Vet. Rec.* **57.** 1. 3-6.]

I should like, finally, to record an unusual case in a spaniel bitch, seven years old, operated on for pyometra under nembutal anaesthesia. Instead of recovering normally from the anaesthetic, she was still unconscious twelve hours later, was snoring heavily, and developed during the day a copious purulent nasal discharge, and a temperature of 107° F. Sulphanilamide L.S.F. (6·6 c.c. per 15 lb. body weight) was given intravenously, together with 5 per cent. glucose in normal saline, 10 oz. subcutaneously. On the following morning breathing was much improved, consciousness returning and temperature falling. Sulphapyridine was given *per os* in suitable supporting dosage (1 gramme per 40 lb. body weight). By the end of the day temperature was normal and nasal discharge had ceased completely. Dosage was continued for a further 24 hours, though the bitch was now completely normal, and made an uneventful recovery from that point.

I have recorded this case because some years before, when sulphonamides were little known or used, I had an exactly similar case in a bitch which had undergone a Caesarean operation, and she died without recovering consciousness.

I have not observed any serious signs of toxicity from the use of sulphanilamide. One has seen occasionally the onset of violent diarrhoea in milch cattle, but this has never been serious in my experience. I have not observed a fall in milk yield which has been said to accompany the use of this drug.

(To be continued.)

SOIL EROSION DANGER

Mr. Russell Lord, Consultant to the Tennessee Valley Authority, recently addressed the Royal Geographical Society on "Soil Conservation in the United States." Mr. Lord quoted Professor Gilbert Robinson, of the University College of North Wales, as saying of the U.S.: "Nowhere else has a drama of soil destruction been so swiftly enacted or on so great a stage." Early surveys of the 1930's reported 50 million acres as "destroyed"—some 80,000 square miles of land—almost equal to the area of England and Scotland, and about half the U.S. present area of cropland of 400 million acres showed plain signs of having been abused by faulty culture.

Opening the discussion, Dr. Dudley Stamp, Chief Adviser on Rural Land Utilisation to the Ministry of Agriculture, and Vice-Chairman of the committee which prepared the Scott Report, gave the warning: "Believe it or not, in spite of our immense progress during the war, we have not yet learned the lesson of soil erosion. There is more danger of it now in Britain—and has been over the past four years—than at any time during the previous ten years." Dr. Stamp disagreed that British farming methods applied in U.S. had much to do with soil erosion. Early Anglo-Saxon agriculture meant small farms with hedges and drainage following natural contours, and the methods of "rehabilitating" soil-eroded land were but the old time practices of European and even older agriculture such as "terraces" and "windbreaks." We in Britain should take warning from U.S. experience and with the great incidence of arable should not say "It can't happen here," but knowing that it could, should take proper precautions against it.

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Weekly Wisdom

A professor is a man whose job it is to tell students how to solve the problems of life which he himself has tried to avoid by becoming a professor.—"Peterborough" in *The Daily Telegraph.*

THE VETERINARY RECORD

May 19th, 1945

PROGRESS IN THE DISCOVERY OF NEW DRUGS AND ITS MEANING TO THE PRACTITIONER

IN recent years advances in chemotherapy have produced radical changes in the treament of many diseases both in man and animals. One can say that the discoveries of sulphonamides and of penicillin have revolutionised therapeutics, and a vast clinical experience has shown that a number of bacterial infections can now be rapidly controlled in a manner which justifies the use of the word "cure." The clinical course of some infectious diseases of man in particular has been so altered that the usual textbook descriptions of these diseases, it is said, will have to be rewritten.

The history of the discovery of these powerful chemotherapeutic agents is interesting. On the one hand the discovery of the original prontosil rubrum by Domagk was the reward of systematic organised investigation by the I.G. Corporation, and was only successful after many years of costly and laborious research. On the other hand, the discovery of penicillin was due solely to a chance observation by Fleming of the inhibition of a culture of staphylococci by a contaminating mould. In passing, one may note that both these discoveries were purely empirical, that is to say they were not derived from previous knowledge of the interaction between bacteria and chemical agents. However, since the discovery of the original prontosil a great deal of work has been done on the mechanisms of chemotherapeutic action. First, it was shown by the Tréfouëls that prontosil was converted in the body into p-amino-benzene sulphonamide (sulphanilamide) which was responsible for the anti-bacterial action of prontosil itself. From sulphanilamide other compounds such as sulphapyridine, sulphathiazole and sulphadiazine have been derived and the field of action has been thereby enlarged.

Advances in the understanding of chemotherapeutic agents have also come from the studies of the metabolism and nutritional requirements of bacteria. Dr. Brownlee has ably summarised the considerable body of research in this field, a subject which appears formidable indeed to practitioners of veterinary medicine who can hardly be expected to have the biochemical background required for its proper understanding. The principles here involved may be simply stated. If the nutritional and metabolic requirements of a particular species of bacteria are known it may be possible to find chemical substances which will interfere with the normal metabolism of the bacteria in such a way as to kill them off with minimal damage to the infected host, whose cells are not identical in their most urgent metabolic requirements.

An outstanding discovery in the field of bacterial metabolism was that of Woods, who showed that the antistreptococcal action of sulphanilamide was antagonised by p-amino-benzoic acid. Woods and Fildes suggested that this antagonism was due to a close chemical resemblance between these two substances. P-amino-benzoic acid is normally required by certain bacteria for their continued life and multiplication, and it is probably utilised by some enzyme action. Sulphanilamide, and other sulphonamides, resemble p-amino-benzoic acid sufficiently closely to combine with the enzyme which normally deals with the latter, but the sulphonamides cannot be utilised for bacterial metabolism. In so far as these drugs occupy the surface of the enzyme they prevent the utilisation of p-amino-benzoic acid, which is an essential foodstuff; in consequence the bacteria die, as one might say, of starvation. The process is usually described as one of substrate competition, *i.e.*, p-amino-benzoic acid and the sulphonamides compete for the enzyme concerned.

This principle has been extended particularly by the work of McIlwain, and Dr. Brownlee mentions the antagonism shown by pantoyltaurine to the uptake of pantothenic acid, and by pyridine-3-sulphonic acid to the assimilation of nicotinic acid in the case of bacteria which require these growth factors. It is certainly of general interest to find that chemical substances, classified as vitamins, which are required for normal health by higher animals are also necessary for bacterial growth, and this fact perhaps in large part explains why it may be difficult to find drugs which will inhibit bacteria without at the same time being injurious to the tissues of the host.

The explanation of the development of drug resistance in bacteria is to be sought in some adaptive change in bacterial metabolism. There is already evidence to show that bacteria can acquire the ability to split certain sugars through the development of the appropriate enzyme, and a similar process of adaptation might account for the onset of drug resistance.

In addition to these chemical mechanisms involved in chemotherapy there must also be physical processes, particularly those relating to surface activity, *e.g.*, electric charges, surface tension and effects. These will be responsible for adsorption of the drug on to the surface of the bacteria or tissue cells and also for the subsequent penetration into the interior of the cell. Indeed these physical processes may finally account for the chemical reactions of cellular metabolism.

Finally it must be realised that sulphonamides have limitations, deriving on the one hand from the types of bacteria sensitive to their action, and on the other hand from their toxicity. Penicillin, of course, has negligible toxic actions, but it also is effective only against a relatively small number of bacterial infections, and we still await the discovery of drugs which will enable us to control tuberculosis and virus diseases. It is evident, therefore, that very much remains yet to be done in the realm of chemotherapeutic research. The practitioner need not despair if he finds that he cannot follow the details of the laboratory worker's activities; indeed his own task of assessing the clinical value of new drugs is one of the most important links in the chain of progress, and to learn how best to use these potent remedies in the diseases for which they are recommended is a whole-time occupation.

VETERINARY SURGEON SHORTAGE AND HERD ATTESTATION

It was reported at a recent meeting of the Carmarthenshire Agricultural Committee that there were 3,133 attested herds and 187 herds of dairy cattle in the county, and that veterinary surgeons were too busy to deal with applications for entry.

Alderman W. D. Davies urged that representations be made to the Ministry of Agriculture for additional veterinary surgeons to examine for attested herds. "It is unfair that the country should be blamed for not having more attested herds, when it is due to the shortage of veterinary surgeons," he declared (states *The Farmers' Weekly*).

It was agreed to communicate with the Ministry of Agriculture on the matter.

* * * * *

The Colonial Office announces that it has been decided to establish in Trinidad a Colonial Microbiological Research Institute, for the general study of microbiological problems in tropical conditions. The first director of the Institute will be Dr. A. C. Thaysen, of the Chemical Research Laboratory, Department of Scientific and Industrial Research.

SEPTEMBER, 1939—MAY 8th, 1945

RETROSPECT AND PROSPECT

PRESIDENTIAL MESSAGE TO MEMBERS, N.V.M.A.

THE long-awaited announcement that Germany had unconditionally surrendered was made by Mr. Churchill on May 8th, at 3 p.m. The war in Europe is over and the problems of peace begin. It would not be fitting to allow this historic moment to pass without comment, and it is my privilege and responsibility to send a message to our readers.

The members of the veterinary profession have a right to a full share of satisfaction and rejoicing, for, in common with others in almost every walk of life, they have played their parts both directly and indirectly in the successful five and a half years' struggle against Germany.

The future can often best be seen against the framework of the past, and we may allow ourselves a moment's retrospection to review, perhaps in better perspective now than earlier, some of the more outstanding happenings of the war years.

Probably for us, from among the excitement, uncertainty and confusion of the early weeks of the war, the first important fact to emerge was that the maintenance of health and productivity of Britain's livestock was a matter of imperative necessity. The feeding of Britain's millions had to be chiefly from Britain's soil, no longer aided by overseas imports. The soil had to be made to produce food for man and beast in quantities far greater than ever before. Milk was allotted the first livestock priority, and the bread corns the major crop priority. Grassland, always the cheapest and easiest milk producer, was cut by millions of acres. Stock had to be concentrated as the arable increased, and concentration of livestock always brings special problems. Long before agriculture had settled to the new ways, added strain was thrown upon its resources. The German wild beast, till then stationary behind its western wall, burst its barriers and swarmed through to the European seaboard from Norway to Spain. Refugees poured in from other countries, increasing the mouths to feed, and the submarine campaign interfered with supplies. Great Britain stood alone waiting, so the world thought, for its turn to be overrun.

Then was fought the Battle of Britain, and the blitz began. The threats of gas and secret forms of new warfare created their own problems and called for special precautions.

Hitherto, the personnel of the profession was largely intact. Some had made the supreme sacrifice, some had suffered personal injury, some had their premises damaged or destroyed, while some in the danger zones had to abandon their practices. Soon the call for officers for the Royal Army Veterinary and Remount Corps became urgent, and the younger men went and practitioners lost their assistants. There was more work to do and fewer to do it.

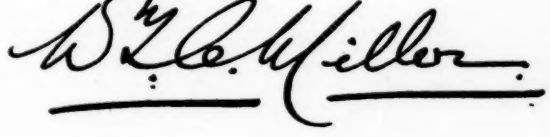
The N.V.M.A., meantime, had not been idle. As well as its routine work, already onerous, the Control Scheme for Dairy Cattle had been launched following a series of meetings of committees, delegations, consultations, etc., as remarkable for the amount of work done as for their numbers. Contacts were made, at first somewhat tentative but becoming stronger with the growth of mutual confidence, between the Association and other National bodies, especially, but not exclusively, with the Ministry of Agriculture and the National Farmers' Union. These contacts have gradually become forged into links of mutual co-operation and consultation, which must be maintained in future.

In the practices up and down the country, veterinary surgeons have had to accommodate themselves to conditions which might well have appalled the stoutest. The practitioner has been beset by a multitude of handicaps : difficulties of travelling by rail and road—petrol rationing, shortage of tyres and spare parts, the nerve-rack and the hazards of the black-out ; shortage of help and labour in the home, in the surgery and on the farm ; restricted supplies of drugs, instruments, clothing and other equipment ; the added burdens of clerical work imposed by essential regulations, and numerous other irritations calculated to destroy equanimity. Grumbles and complaints there have been ; most were justified, but others concerned difficulties that were insoluble. The Association's Officers throughout the years of war, and the sadly depleted staff of the General Office, suffered with others, and it is fair to say not less than most. Conditions in London have often been hardly those most conducive to calm thought and clear judgment. But the Central Office of the Association, though evacuated for a time to provincial quarters, has never for a day ceased to function and *The Veterinary Record*, though at times late and occasionally a mere shadow of its former self, has not missed a single publication.

All this and more too is worthy of a moderate feeling of pride in achievement by the members of the veterinary profession in Britain. We hope in due course to give our readers an account of the activities of our members in spheres of work outside these islands during the war years, but we are more concerned just now with our own affairs at home.

If we have paused to reconsider the past, it is certainly not with any intent to suggest the time has now come when effort can be slackened or that the need for striving is over. The European war is won, but the Japanese war goes on. In complimenting each and every member upon his work during the war, it is essential to add that more effort and a continued strain will be our lot for some considerable time. The Minister of Agriculture, in a recent Press message, has indicated that the needs for food are as urgent as ever ; that whereas hitherto our home supplies have been produced for ourselves and our allies mostly at home, there are now added burdens to be shouldered. The famished peoples of Europe must be aided and partly at least supplied with food, and there is the extra responsibility to feed some 6,000,000 prisoners of war.

Everyone concerned with agricultural production must carry on : their war is not yet won. Everyone concerned with the combat against disease must continue ; their war will never be over. Members of the veterinary profession themselves appreciate this and will not slacken in their efforts. Whatever new plans and changes become essential in future the time for easing up is not yet. The volume of disease on our farms at home and the wastage of money and effort must be reduced further before we can expect to enjoy the fruits of victory.



CLINICAL COMMUNICATION

Poll-Evil and Fistulous Withers*

CLEMENT ELPHICK AND J. D. PEELE

Mr. Elphick. *Subject*—Seven-year-old valuable cart gelding. In May showed a bilateral enlargement and marked rigidity of atlo-axis joint, so that the animal was unable to graze. Hot blanket cravattes were applied for a week and this successfully brought the swellings to a head. A mild, stimulating liniment (methyl salicyl) was now applied, and a few days later both swellings were lanced. A copious discharge exuded and a sample was sent to Mr. Lyle-Stewart's department, where a bacteriological examination was carried out by Mr. E. Gray. The punctured cavities were syringed out twice daily with acriflavin solution (1:1,000).

Resolution proceeded slowly and a few weeks later Mr. Lyle-Stewart supplied me with a small quantity of sulphanilamide cream for trial. This was injected into the still open wound by means of a hypodermic syringe fitted with a probe-pointed needle. To facilitate easier injection the cream was brought to blood heat in a water bath. The cream was well retained.

Subsequent visits showed that the enlargements were diminishing, the horse was happier, there was no discharge, the normal head and neck movement was restored. Early in July it was considered that the horse had made a complete recovery.

Drastic surgical interference might have produced a similar result over a more lengthy period, but an objection to the radical operation is the danger of rendering an animal "bridle shy" and therefore useless. I consider that the sulphanilamide cream was distinctly useful, and am obliged to Mr. Lyle-Stewart for his suggestion and help.

Mr. Peele. Three cases of poll-evil and fistulous withers in horses have been successfully treated with Ministry's No. 1 Vaccine. One case of poll-evil and one case of fistulous withers had been under treatment with setons and blisters; both cases showed no response. Five c.c. of Ministry's No. 1 vaccine (*Br. abortus*) was injected subcutaneously, four injections being given at five-day intervals. A tremendous local reaction was produced in both cases. The swellings burst and discharged pus. These animals recovered uneventfully.

The third case was one of commencing poll-evil and there were no fistulae and no discharge. Five days after the first injection the swelling had receded to about half the size and was almost painless. A tremendous local reaction followed the second injection of vaccine, together with systemic disturbance evinced by inappetence, temperature 105° F., and by stiffness from the swelling which extended from the poll down to the foreleg. This gradually subsided and the poll-evil completely resolved in one week.

* Cases reported to the meeting of the North of England Division, N.V.M.A., at Newcastle-upon-Tyne, December 1st, 1944.

REVIEW

[Index of Diagnosis for the Canine and Feline Surgeon. Hamilton Kirk, M.R.C.V.S. (Second Edition, 1935.) Baillière, Tindall & Cox. Price 35s., postage 7d.]

It must be a matter for congratulation and pride to the author that a second edition of this work has been called for and produced at the very climax of the paper shortage and at a time when eminent authors are clamouring, without success, at the doorsteps of publishers to get their works into print.

The first edition (1939) was reviewed at some length in *The Veterinary Record*, and we repeat our commendation of this book to all concerned with canine and feline work, also recommending them to obtain the new edition before it is sold out. The first edition was notable for its beautiful format, with its wide margins, good paper, and excellent reproduction of illustrations, notably those in the portions of the work devoted to X-ray diagnosis. The exigencies of war-time publishing have inevitably diminished these excellences, yet the volume remains easy to read, and lighter on the hand than previously. This despite an increase of 25 pages and a closing up of type, due to additional subject matter.

Random try-outs of the reviewer's pet topics reveal that the book is up to date, and has covered the literature thoroughly. The sections on oral inflammations (pp. 80, 92, 329), might well be combined into a comprehensive essay, and we venture to suggest that the vitamin B group plays a greater part in, at any rate, the numerous war-time sub-acute inflammations of mouth and tongue than our author concedes. And please, what about "*per orem*"? The section on canine hysteria might be improved by the inclusion of recent observations in the literature, which have possibly escaped the author's eye.

But these are minor points of criticism where the whole is so good, and we congratulate Major Kirk on his accomplishment, and his publishers on so notable an achievement under present conditions.

ABSTRACT

[The Isolation of *Actinomyces bovis* from Fistulous Withers and Poll Evil. Kimball, Alice and Frank, E. R. (1945.) *Amer. J. vet. Res.* **6**. 39-44.]

This paper is of unusual interest because it is probably the first occasion on which fistulous withers and poll evil in the horse have been associated with *Actinomyces bovis* infection.

The authors state that the investigation was started because a search of the literature failed to show that any extensive investigations of the anaerobic flora of material from such lesions had been undertaken. The material used for bacteriological examination was obtained from 50 unopened and untreated cases of fistulous withers and five cases of poll evil presented at the Kansas State College veterinary clinic for treatment. As a result, *Actinomyces bovis* was isolated from 40 typical cases and, in all cases, the organism was stated to be of the "smooth" type.

The authors point out that a significant difference between the exudate in these cases of fistulous withers and that usually found in actinomycosis was the absence of the characteristic "sulphur granules" of actinomycosis. This feature, they suggest, may be due to the fact that rosette formation is associated only with the "rough" type of the organism.

G. D.

Questions and Answers

"Questions and Answers" will be published on alternate weeks.

The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Skin Tuberculosis

Q. LXXI.—*I have frequently heard references made to "skin tuberculosis." Is this condition very common and what is the characteristic appearance of the disease?*

A.—Tuberculosis of the skin does occur in domestic animals, but judging from the literature, it must be rather rare and certainly not as common as it is in man. No standard characteristic clinical picture has been described and the lesions would appear to vary from a localised dermatitis to nodular chain-like swellings following the course of the skin lymphatics and to small caseous abscesses and ulceration.

The points which would lead to a diagnosis would be most probably coincidence with tuberculosis elsewhere or resistance to the usual treatments for skin disease, leading to the examination of discharges, pus, or a portion of the lesion by a pathologist.

The existence of tuberculosis of the skin might also be brought to light owing to unexpected positive tuberculin reactions in supposedly clean herds. Quite large positive reactions may be obtained in skin lesion cases which on *post-mortem* and biological examinations show no other lesions.

In this country, Hole and Hulse (*J. comp. Path.* (1939.) **52**. 501) have made a detailed examination of a series of such cases. They noted that the commonest site of the lesions is in the legs. In character the lesions are not painful and as a general rule form rounded swellings, but thick-walled abscesses may be encountered. There may be superficial ulcers. Acid-fast bacilli can usually be detected in smears, but at present there is no proof that the skin lesions or the acid-fast organisms are responsible for tuberculin sensitisation. So far all attempts to cultivate the organisms have failed. American workers have reported skin lesions in which organisms other than acid-fast bacilli have been found.

If tuberculosis of the skin is other than a rare occurrence it is strange, in view of the amount of testing and the thousands of stainings for acid-fast organisms that are done, that it is not more widely recognised.

Tuberculin Testing of Pigs

Q. LXXII.—*Can you please advise me how to conduct a tuberculin test on a herd of pedigree pigs? Is it practical to use the comparative test?*

A.—The comparative tuberculin test may be used satisfactorily on pigs.

When testing a herd of pigs, eight to ten animals may be quickly and firmly cornered in a suitable building by a low gate or board and the animals carefully approached one by one. Difficult subjects may be controlled by a rope placed round the top jaw, which should be attached to a post ring or held securely by an assistant. Care must, of course, be taken when handling pregnant animals. Whatever method of restraint is adopted the ears must not be handled, as consequent bruising may interfere with the interpretation of the test.

The site usually recommended for the injection of tuberculin is the loose skin at the base of and behind the ear. Reactions at this site, however, are not very clearly defined and, moreover, irritation caused by the injection may result in the animal rubbing the area against the trough or wall. The writer prefers to inject the tuberculin at a point along the anterior edge of the ear approximately midway between the tip and the base, and use the ordinary type of intradermal syringe as recommended for the bovine test. The actual injection is best performed by standing behind the ear of the pig on a level with the animal's shoulder and facing the same direction as the animal. A dose of 0·1 c.c. of tuberculin is then carefully injected into the dermis at the point indicated, and its presence is shown by the appearance of a pea-like swelling similar to that produced by intradermal injections in the cow, but which, however, disappears more quickly. Avian tuberculin should be injected into one ear and bovine into the other, and as in the case of cattle a fixed routine should be adopted to avoid confusion with the two different types of tuberculin.

The sites of injection should be examined 48 hours later. Reactions are practically always evident at this hour, but if the findings appear to be inconclusive a second injection of tuberculin should be given and further observations made at the 72nd hour.

In pigs, positive and negative reactions are usually very well defined and easy to distinguish.

A positive reaction is characterised by a hot, puffy, extremely oedematous swelling along the anterior edge of the ear frequently extending to the base or even to the posterior surface of the ear and resembling an acute painful haematoma.

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The Methylene-blue Test

Q. LXXIII.—*What is the methylene-blue test in connection with milk hygiene?*

A.—The methylene-blue reductase test is a test used for determining the degree of bacterial contamination of milk and is now the official test used in England and Wales for tuberculin-tested and accredited milks under the Milk (Special Designations) Order of 1936.

Ten ml. of milk and 1 ml. of a standard methylene-blue solution are put in a stoppered tube and incubated in the dark in a water bath at 35° C., each tube being inverted at 30 minutes' intervals till reduction begins. The time taken for reduction is related inversely to bacterial activity and for the designated milks it is laid down that milk must not decolourise the methylene-blue within 4½ hours if the sample is taken between May 1st and October 31st, or within 5½ hours if the sample is taken at any time from November 1st to April 30th. Milks which remain blue after these tests are classed as satisfactory, while those turning white fail to pass the test and the milks are thus considered to be below the prescribed bacteriological standard of such milks.

These tests replaced the bacterial plate tests which were in use for designated milks prior to 1937. The tests actually depend on the presence or absence of bacterial enzymes and it is interesting to note that Duclaux, as far back as 1887, was the first to observe the reducing action of milk on dyes.

The methylene-blue test was, however, not accepted in Scotland and the plate test was retained in the Milk (Special Designations) (Scotland) Order of 1936.

In 1944, however, the Secretary of State for Scotland prescribed "The Heat Treatment of Milk (Prescribed Tests) Order (Scotland), 1944," which lays down that milk sold as "heat treated" milk must pass both a phosphatase test and a methylene-blue test.

This methylene-blue test differs from the former test in that milk is not incubated at a given temperature, but "the test shall be deemed to be satisfied by milk which fails to decolourise methylene-blue by 12 noon on the day after the sample of the milk has been taken. The milk to be tested shall be kept at atmospheric shade temperature until the test is completed. The test shall be begun within one hour after the sample has been delivered to the laboratory."

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Hypomagnesaemia

Q. LXXIV.—*Dairy cow, calved two months ago. Condition fair. Suddenly falls down when coming in for milking; gets up, staggers about, trembles, shakes her head, blinks her eyes rapidly. Calms down when left quiet. Symptoms return when approached. Shows no response to calcium therapy. Dies within three days.* Post-mortem *examination reveals acute abomasitis. What is the cause of these symptoms? Is there any rational treatment? Advice greatly appreciated.*

A.—From the symptoms described the case would appear to be a typical hypomagnesaemia (grass tetany, Hereford disease) and magnesium therapy would probably have effected a cure. A common formula is 4½ oz. of $MgSO_4$ and 2 to 4 oz. glucose dissolved in 16 to 20 oz. water and given by injection. The injection is usually given subcutaneously, but in acute cases may be given *very slowly* intravenously. The injection may be repeated every 12 hours if necessary and molasses and $MgSO_4$ given per os. Absolute quiet is desirable and chloral hydrate may be given to quieten the animal temporarily.

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Rabies

Q. LXXV.—*In view of the possible introduction of rabies into this country as a result of war-time conditions, would you please advise me of the clinical differences between this disease and other diseases such as canine hysteria and the nervous form of distemper, etc.?*

A.—One cannot say that the clinical differences are sharp, but a general consideration of the well-known clinical manifestations in cases of nervous distemper and hysteria should serve to guide the practitioner in large measure towards distinguishing these diseases from rabies. The ingestion of foreign bodies, though not so frequently met with, especially in the dumb form, as text-books would lead one to think, is nevertheless a symptom of rabies that in any country other than Great Britain, the practitioner would have to keep constantly in mind. To help determine whether rabies might be the cause of the phenomena exhibited, one should carefully observe the animal for other evidences of this disease. These are: fretfulness, moodiness, tendency to stray away and the consumption of garbage. There is a tendency to bite animate or inanimate objects. The animal is strange in its manner; becomes angered or excited; the voice has an altered note, the bark becoming more of a hoarse growl. Usually there is strabismus and pupillary inequality. The phenomenon known as "fly-catching" is a prominent feature of the disease, the animal snapping in the air at imaginary flies. In the so-called dumb or paralytic type, in addition to some of the foregoing symptoms, the outstanding features are somnolence, loss of balance, difficulty in opening the mouth, paralysis of the lower jaw and/or hindquarters. A general loss of muscular power is early evident, together with salivation, a vacant stare, and the tendency to wander far from home. A few of these symptoms in combination should point to the possible nature of the malady. Naturally in any case suspicious of rabies the first procedure will be to secure the animal in an enclosed kennel or cage where observation may be kept, without danger to the attendants.

The length of time a dog lives when suffering from rabies depends upon whether an early or late diagnosis has been made. A suspected case should be kept 14 days under observation before any opinion is passed. Only on *post-mortem* examination can a definite diagnosis be made, and then only by securing the services of a pathologist. Laboratory investigation is probably seldom undertaken unless some unfortunate person or animal has been bitten by the dog. It is well to bear in mind that the incubation period may vary from four days to two years.

The clinical picture in hysteria is rather different. Firstly, it is of very sudden onset and runs a far more rapid course, the animal being at one moment apparently quite well and normal and the next moment, suddenly commencing to shriek or bark, it rushes about and—if on a lead—struggles to get away: or it may stand and stare at imaginary objects. It turns the head suddenly as though about to be struck; jumps up the walls of the room, knocking down pictures or ornaments; dashes from place to place barking all the time.

Then may start severe clonic convulsions during which the animal may assume a recumbent position but does not entirely lose consciousness. It soon jumps up again, knocking over things which stand in its way, but makes no attack upon those in attendance—thus differing from rabies. The pupils are dilated and there is evident aberration of sight; involuntary evacuations take place and the dog seems in acute fear. Such a syndrome is peculiar to hysteria and could hardly be mistaken for any other condition, with the possible exception of furious rabies. But the rabid dog evinces a great tendency to bite, has a remarkably changed voice and, later, becomes paralysed, especially in the lower jaw. The saliva of rabies is infective, but the examination of saliva for diagnostic purposes is very unreliable: the only reliable method is the inoculation of brain emulsion into a rabbit, and whilst the patient is isolated under observation. In hysteria it is not uncommon for the temperature to rise very high, even—in some cases—to 107° F. Attempts to take the temperature of a dog suspected of rabies, however, should never be made.

In meningitis or encephalitis the animal is restless, whines, moves aimlessly about, blunders into objects, and may become wild and delirious for brief periods. Sometimes it moves slowly round in a circle, generally in one direction; or it may stand motionless with the head pressed against a wall. The mucous membranes are injected, the pupils contracted and the temperature is round about 103° F.

After some hours of these preliminary symptoms, acute convulsions may set in but are unaccompanied by a loss of consciousness. The simple epileptiform convulsions so commonly associated with distemper would not lead a clinician to suspect rabies or hysteria, but there is no doubt that in all derangements of the brain one will encounter very great difficulty in distinguishing one from another. In the cerebral form of distemper a dog, during a convulsion, may bite the attendant or even himself, but after the convulsion is over the dog becomes more or less normal and may eat well; in other words, the convulsions are *intermittent*, but in rabies the aggressive convulsions are continuous, and the dog never becomes normal, neither does he eat nor drink.

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Eradication of Fleas from Catteries

Q. LXXVI.—*I shall be glad of instructions as to how to eradicate fleas from catteries. These are situated in a floor-boarded room over a garage and the fleas are much smaller than the ordinary household specimen. I had the same trouble last year but during the winter was not troubled with them. I have tried various things to exterminate them. Fumigation has no effect; washing the floors with coal tar solution is only of temporary benefit. The cracks or spaces between the floor boards are, I think, where they multiply.*

A.—Each compartment should be carefully swept and the cleansing of cracks may, if circumstances permit, be more adequately cleared of debris using a vacuum cleaner. This process should be followed by thorough scrubbing with soda water, then soaking with a derris lotion (or substitute preparation). A blow lamp is also of help in dealing with the cracks. It is desirable that the latter should be stopped with plastic wood to facilitate future cleansing and pieces of lino may be used for flooring material.

The majority of cats harbour fleas, and in order to prevent further contamination of the premises they should be dressed with derris (or substitute) before putting in the clean kennels. This dressing may with advantage be made a weekly routine especially in the warm weather. It is possible that the questioner's disappointing results of last year were due to reinfestation rather than inadequate cleansing of the cattery.

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Correspondence

Restraint When Docking a Foal

Sir,—I cannot agree that the best method of restraint for the docking of a foal is the technique outlined in a recent issue of *The Veterinary Record*. Neither could I agree that docking is more or less restricted to pedigree animals.

Irrespective of age, I would suggest that the foal should be haltered, an adjustable halter being found most suitable for this purpose. The halter is easily applied if the foal is "cornered" by backing the mare into a corner of the loose-box. The foal should then be secured to a ring in a manger or any other fixed object, taking care to avoid any obstacle such as a barred gate through which the foal might sustain an injury to the fore-legs. It is very important that the foal should be pulled as close to the "ring" as possible, so that no slackness can arise between the foal's head and the point of attachment; also that the foal should not stand on a hard floor during the operation owing to the risk of concussion during any struggling causing a fractured pastern or other injury. It will usually be found advantageous not to crowd the foal against a wall or gate, but to let it merely pull on the halter and hang back on its own accord—crowding against a fixed object usually causes unnecessary struggling on the part of the assistant as well as the foal. Although long hair should be held back by a ligature, the ligature applied to the stump of the tail should be applied after the actual operation. The knot should be placed on the ventral side of the tail, the extra pressure from the knot helping to prevent haemorrhage from the arteries. Application of the ligature before the operation frequently fails to control haemorrhage and several subsequent attempts to control haemorrhage by cautery may be necessary. From my limited experience I am of the opinion that nothing brings more disrepute to a young graduate in the eyes of a client than faulty technique in this simple operation.

Yours faithfully,

H. C. Swann.

King's Lynn.

Castration of the Adult Boar

Sir,—In the issue of *The Veterinary Record* for April 21st, 1945, "Questions and Answers," Question No. LXIII, asks for the method considered to be best for the castration of the adult boar. The answer commences by stating that castration of the adult boar is a doubtful economic proposition, and goes on to deal with such irrelevant matters as "the shield," or the boar's armour plating.

Meat from adult porcine animals is used for manufacturing purposes, and of such, adult boar meat is the lowest grade and consequently fetches the lowest price. If a farmer has an adult boar, no longer fit for service as such, and the animal is castrated, kept on the farm for about a month, or until the operation wounds have healed, then marketed, the meat is no longer "boar meat," but "stag meat," and commands a price about 4s. per score above that of boar flesh.

Most "stags" are heavier and fatter than boars, so that there is a considerable inducement for farmers to have their boars castrated and fattened before marketing.

The meat being of the manufacturing grade, the thickness of the "shield" does not matter much, as carcases have to be skinned as well as boned. The statement made in the answer that the dense thick tissue in the neck region in the boar will not be materially reduced after castration and during fattening, is not in accordance with practical experience.

Having had some experience of adult boar castration, I would urge that a general anaesthetic be *always* used.

Yours faithfully,

D. J. Anthony.

High Lodge, Iverley
Stourbridge, Worcs.
May 1st, 1945.

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Equipment of Car for Use in General Practice

Sir,—Your answer to query, "What to carry in a country practice," brings back to memory the remarks of Professor MacQueen to his students in his obstetric class: "Aye, when you are called out to a calving case you send out the market cart in front of you with your instruments and when you get there you don't know how to use them. The most successful practitioner is the one who goes with *only* two hooks, probably made by the local blacksmith."

If alive to-day the learned professor would probably answer the above question by saying, "Don't go out with a five-ton lorry with your surgery aboard. Carry a few first aid requirements and a fund of '*common sense*'."

Yours faithfully,

J. Forbes.

Truro.
May 8th, 1945.

THE DANGERS OF UNBOILED SWILL

In a recent further announcement on the above, the Ministry of Agriculture say: "Carelessness over the handling of raw swill has caused very serious losses, not only to individual farmers but also to the nation at large. There can be no doubt but that many recent outbreaks of foot-and-mouth disease could have been prevented if greater care had been taken to ensure that no unboiled swill came into contact with animals. Such carelessness must be prevented.

"Owners of animals who do not comply with the law which requires raw swill to be kept apart from animals cannot expect their infringements to be overlooked. The authorities have in the past few months prosecuted pig owners in many parts of the country for infringements of this kind and very heavy fines have been imposed. In one instance, where a flagrant disregard of the regulations was discovered, a fine of £100 was inflicted.

"It cannot be too strongly urged, or too frequently repeated, that the feeding of unboiled swill to animals involves a very serious risk of outbreaks of foot-and-mouth disease and swine fever. The nation cannot afford the wastage caused by these diseases. If you have charge of animals it is your duty to take every possible precaution to ensure that they do not come into contact with unboiled swill."

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The fact that pure native Shetland cattle continue to be almost immune from tuberculosis was stressed at a gathering of farmers, crofters and dairymen after they had seen a North of Scotland College of Agriculture film on clean milk production. Mr. D. Clouston, veterinary surgeon, disclosed that tuberculin testing of native cattle showed that only 2½ per cent. were reactors. As they were kept in small numbers there was much less risk of infection, especially from imported animals.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

May 22nd.—R.C.V.S. Council Election—Voting Papers issued.
May 29th.—R.C.V.S. Council Election—Voting Papers to be returned.
May 30th.—Spring Meeting of the Eastern Counties Division, N.V.M.A., at Ipswich, 2 p.m.
May 30th.—N.V.M.A. Survey Sub-committee on Pig Diseases, 10.30 a.m.; Survey Sub-committee on Calf Husbandry and Calf Diseases, 2 p.m., 36, Gordon Square, W.C.1.
May 31st.—N.V.M.A. Survey Committee, 11 a.m., 36, Gordon Square, W.C.1.
May 31st.—Meeting of the Derbyshire Division, N.V.M.A., at Sutton Bonington, 2 p.m.
June 1st.—Resumed N.V.M.A. Survey Committee, 10 a.m., 36, Gordon Square, W.C.1.
June 5th.—Meeting of the V.V.B.F. Ladies' Guild, at 10, Red Lion Square, W.C.1, 2.30 p.m.
June 5th.—R.C.V.S. Council and Committee Meetings.
June 5th.—R.C.V.S. Annual General Meeting, 10, Red Lion Square, W.C.1, 12 noon.
June 5th.—V.V.B.F. Annual General Meeting, 10, Red Lion Square, W.C.1 (following above).
June 6th.—R.C.V.S. Committee Meetings.
June 7th.—Meeting of the Central Veterinary Society at the Veterinary Laboratory, Ministry of Agriculture, Weybridge, 2 p.m.
June 7th.—R.C.V.S. Council and Committee Meetings.
June 28th.—R.C.V.S. Written Examinations.
June 29th.—R.C.V.S. Written Examinations.
July 2nd.—R.C.V.S. Oral Examinations begin.

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PERSONAL

Appointment.—Sir Donald Vandepeer, K.B.E., has been appointed Permanent Secretary of the Ministry of Agriculture and Fisheries, in succession to Sir Donald Fergusson, who becomes Permanent Secretary to the Ministry of Fuel and Power. Sir Donald's appointment will take effect on June 1st, 1945.

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Marriage.—Gates—Balls.—In London on April 27th, 1945, between Harry S. Gates, M.R.C.V.S., and Iris Jay Balls.

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R.C.V.S. OBITUARY

Walker, William, Major R.A.V.C. (T.F. Res.), of 35, Upper Dicconson Street, Wigan, and 62, Pemberton Road, Winstanley. Graduated Edinburgh, December 18th, 1909. Died May 5th, 1945; aged 58 years.

Major Wm. Walker, M.R.C.V.S.

A large number of friends, both in the profession and beyond, will regret to learn of the death of Major William Walker, M.R.C.V.S., who died after a short illness.

Major Walker was the son of the late Mr. William Walker, of Midtown, Cornhall, Scotland. Shortly after qualifying at Edinburgh, he went to Wigan as assistant to the late Mr. W. S. Worthington. He served in the last war until 1919 in the Army Veterinary Corps, in France and Germany. On his return to Wigan he went into partnership with the late Mr. William Woods, of Standishgate, and later moved to Upper Dicconson Street. Major Walker also served for many years as an inspector for the Ministry of Agriculture and Fisheries.

Deep sympathy is felt for his widow and son, Flight-Sergeant G. F. Walker, R.A.F., who is a pilot serving in Australia.

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ADDRESSES OF DISEASE-INFECTED PREMISES

Foot-and-Mouth Disease:

Worcestershire.—Perry Mill Farm, Holt End, Beoley, Redditch (May 13th).

Swine Fever:

Aberdeenshire.—Balcairn, Old Meldrum (May 9th).
Cambs.—Hawk's Nest Farm, Wilburton, Ely (May 10th).
Essex.—31, Southview Road, West Thurrock, Grays (May 8th); East Street, Dovercourt (May 12th); Lofts Farm, Great Totham, Maldon; The Bungalow, Maldon Road, Tiptree (May 14th).
Glamorgan.—Riverside Cote, Ferndale, Rhondda (May 11th).
Gloucestershire.—Siddington Road, Siddington, Cirencester (May 7th); Chesterton Farm, Cirencester; Moreton Hill Farm, Standish, Stroud (May 12th).
Leics.—Blaby Mill, Mill Lane, Blaby (May 8th).
Northants.—1, Harborough Road, Desborough, Kettering (May 8th).
Oxon.—Brookside Poultry Farm, Beckhington Road, Weston-on-the-Green, Bicester (May 14th).
Roxburghshire.—Cliftonhill Cottages, Ednam, Kelso (May 5th); Oxnam Neuk, Jedburgh (May 11th).
Somerset.—Silver Street, Curry Mallet, Taunton (May 14th).
Stirlingshire.—East Carmuirs Farm, Camelon, Falkirk (May 8th).
Warwicks.—9, Highbridge Road, Sutton Coldfield, Birmingham (May 9th).
Wilts.—"Godfreys," Stone Lane, Lydiard Millicent, Swindon (May 14th).
Worcs.—The Knapp, Shrawley, Worcester (May 7th).
Yorks.—Royds Lane Allotments, Rothwell, Leeds; Moor Top Farm, Hemsworth, Pontefract (May 7th); Salt Pie Farm, Thornton, Bradford (May 8th); Rosedene, Carthorpe, Bedale (May 10th); Thorney Farm, Spennithorne, Leyburn; Hall Cottages, Spennithorne, Leyburn (May 11th).

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R.C.V.S. ANIMAL MANAGEMENT EXAMINATION

List of Successful Candidates

London:

Allen, W. G.
Barber, Harry
Biggers, Miss J. M.
Capel, L. H.
Chandler, R. L.
Coward, T. G.
Darbyshire, J. H.
Davies, D. M.
Graves, J. A.
Harries, G. M.
Hill, R. B.
Hughes, E. J.
Ibbetson, Miss M. G. (Credit)
James, R. A.
Jenkins, David
Jones, T. D. (Credit)
Lovegrove, Miss M. R.
Marchant, Miss I. F.
Mayes, S. E. V.
Mortimer, K. J.
Nicol, John
Orton, R. G.
Packer, D. O.
Palmer, A. C.
Rackham, Miss J. A.
Reakes, D. G. W.
Rees, D. W. (Credit)
Scott-White, Miss A. (Credit)
Sperber, Miss M. V. (Credit)
Stone, Paul
Swarbrick, Olaf
Tanner, S. C.
Throssell, P. J.
Young, G. F. P.
Young, Stuart

(To be continued)

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POULTRY ADVISORY SERVICE

The Ministry of Agriculture announces that for the purposes of the new Poultry Advisory Service which came into force on May 1st, the country has been divided into eight Provinces each under the direction of a Provincial Poultry Advisory Officer aided by an Assistant Provincial Poultry Advisory Officer. The names of the Provincial Officers are as follows: Messrs. J. B. Morrison, W. F. Wood, A. P. Livingstone, I. W. Rhys, G. E. Reddaway, F. H. Guernsey, G. E. Burkitt and W. Evans.

Mr. Morrison, who will be in charge of the four Northern Counties, has been on the county staffs of Carmarthen and Bedford, and during the latter part of the war has been seconded to the Ministry of Agriculture. Mr. Wood has also been assisting the Ministry during the war, and previously was on the poultry staff of the South Eastern Agricultural College, Wye. He has had practical experience abroad and has been on the poultry staff of a Government experimental farm in Rhodesia. He will be in charge of Yorks. and Lancs.

Mr. Livingstone has been on the Ministry's Education staff for a number of years and prior to joining the Department in 1929 was at Wye College. Mr. Livingstone will be in charge of the Western Midlands.

Mr. Rhys has had wide experience varying from practical poultry keeping to county work in Bedfordshire and has been on the staff of both Seale-Hayne and Harper Adams College. At the outbreak of war he was on the staff of the *Poultry World* and later joined the Ministry's staff. He will be in charge of the East Midlands.

Mr. Reddaway, who will be the Provincial Officer for the East Anglian Province, has been on the county staffs of Cornwall and Glamorgan. He joined the Ministry in 1930 and during the war was seconded for a short while to the Ministry of Food.

Mr. Guernsey joined the Ministry in 1928 after being on the Devon county staff. He will be stationed at Reading in charge

of the South-East Province. Both Mr. Burkitt and Mr. Evans, who will be in charge of the South-West and Wales respectively, were on the county staffs of Gloucester and Glamorgan until shortly after the outbreak of war, when they were both seconded to the Ministry.

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LIVESTOCK BY-PRODUCTS IN THE U.S.

"United States meat packers are sponsoring an ambitious programme to develop the extraction of by-products from livestock," states a Reuter message. "Many of the major companies are financing this work in their own laboratories or in independent research institutes or universities. Among the materials which are being obtained are life-saving pharmaceuticals, food flavour improvers, materials for the plastics industry and scores of other by-products. Armour & Co.'s research laboratory here has developed a substitute for human blood to be used in transfusion cases. This company's laboratory at Fort Worth has produced serums for many diseases, including scarlet fever and measles. In the laboratories of the Swift Co. research of national scope is being sponsored, and the directors this year made their second grant of 200,000 dollars for university fellowships relating to broad agricultural problems. Swift's laboratories some years ago discovered in the course of research on shortenings certain monoglycerides (simple fatty compounds) which produce better results in bakery when added to the products. Through a development by Wilson & Co. animal hair is washed, curled and dried and then used in air filters for furnaces, in tractors and automobiles. It is also in increasing use in sound-proofing."

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

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SULPHONAMIDES IN THE TREATMENT OF BRUCELLOSIS

Sir,—I am greatly indebted to Dr. D. G. Ardley for so kindly pointing out the error of my ways. It was no doubt foolish of me to make use of the word "assert" because, in my letter, I sought to show how, in the present state of our knowledge concerning the sulphonamides, it was unwise to be dogmatic concerning them.

But I did not, as Dr. Ardley implies, base my conclusions on a single case. I was at some pains to explain that the treatment of my child was recommended to me by Dr. Rosen as the result of the success he had achieved in a similar case. And I quoted the Editor of the *Journal of Comparative Pathology and Medicine*, who in a footnote to my original article stated that "several cases of recovery after similar treatment" had been recorded. Also I mentioned the experience of Mr. E. R. Cook, who apparently received treatment with sulphadiazine with "a thoroughly successful result," "although two separate medical practitioners had assured him that treatment with any of the sulphonamide series was of no avail in the treatment of undulant fever."

I would also point out that at the time I applied the treatment the standard dose as laid down by Dr. Ardley, namely "in the order of 4·5 grammes in 24 hours (in divided doses of course)" had not, as far as I was aware, been determined. I did, however, come very near it because I administered 2 grammes of sulphonamide P (B.D.H.) at night (actually about 3 p.m.) and a further 1½ grammes "early on the following morning"—that is, 3½ grammes within 24 hours—with subsequent smaller doses to maintain the reaction. I must admit, however, that even had I known the standard laboratory dose, in view of the clinical condition of the patient, I should probably have hesitated to apply it.

It is reassuring to note that notwithstanding the statement which I quoted from the *Lancet* that "the many pharmacological studies which have been made of the sulphonamides demonstrate the impressive variety of their actions—many of them undesirable in chemotherapy" and the doubts expressed as to the reactions effected on different organisms, Dr. Ardley assures us that "as in human medicine the veterinary applications of sulphonamides are rational and well-founded" and that "there is in correct choice and administration of the sulphonamide drug, a means of obtaining uniform satisfactory results." This is not supported by practical experience. Veterinary practitioners complain that even in the case of mastitis, where the reactions of sulphonamides upon the specific organism in the test tube are known, the reactions in the cow are by no means uniform.

The explanation no doubt lies in what Dr. Ardley defines as "the correct choice and administration" of the drug. This, of course, does not depend solely upon the administration of the stereotyped dose of the drug but upon an exact knowledge of the reaction which may be exerted by the drug upon the micro-organism in the tissues of the patient, a proper consideration of the clinical condition of the animal, the course of the disease and the best time to apply the remedy. It was for that reason that I ventured to put on record my views as to the best time at which to apply sulphonamides in the treatment of Brucellosis.

Yours faithfully,

Little Common, Sussex. Ll. E. W. Bevan.

May 1st, 1945.

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R.C.V.S. COUNCIL ELECTION

Sir,—Your correspondent, Mr. Lishman, by his choice of words avoids the real issue of the current R.C.V.S. Council Election. The issue is not "whether or not a candidate is in favour of *maintaining* the R.C.V.S. as the one and only body capable of exercising control over the teaching of veterinary medicine and surgery, examining in these subjects and issuing registrable qualifications entitling their holders to practise."

The issue surely is, do we wish to facilitate the advancement of veterinary knowledge and practice by encouraging a few universities to interest themselves actively in a full veterinary training, whilst giving to the R.C.V.S. Council enhanced powers of inspection to ensure a minimum standard of examination *and instruction*, or do we wish to continue in comparative isolation with ill-equipped colleges and a weak but much vaunted system of travelling examiners?

Yours faithfully,

As from: W. R. Wooldridge.

Bentley Hyde, Priory Drive, Stanmore, Mddx.

May 11th, 1945.

Sir,—The issue in this pending event is clear cut. It is no less than whether our Royal College is to remain in law, spirit and reality our governing body. Stated briefly, to keep that position it must retain the sole authority to examine and register those desiring to practise as veterinary surgeons, and to entitle themselves as such. That is the essence of the one-portal system, and the crucial question at this election. In General Meeting of the N.V.M.A., and at the various Divisions in meeting assembled, an overwhelming majority of the profession has expressed itself in favour of the retention of these powers and functions unimpaired, in the hands of a Council of the Royal College freely elected by its own members. Let no one, however, imagine that this suffices and makes it superfluous to vote. On the contrary, now is the time to hammer our views home. Despite much clever word spinning by its defeatist critics, can any unbiased student of the Loveday Report still be beguiled into the belief that if implemented, more than a shadow of its powers will remain to the College? If these powers go, they will not go alone. Our profession has its own character and individuality, and its own vocational needs and traditions. What it has already achieved, with mighty little outside help, financial or moral, constitutes a precious heritage from the past and is a guarantee of great promise for the future. Who should know better—or a tithe as well—where the century-old mansion we have built is strong and must not be tampered with, our special needs and how to attain them, or our weaknesses and how to remedy them, than those whose lives have been devoted to the practise of our art and the teaching of our science? Most of us probably regard university status as desirable, if we are welcomed and admitted as equals among the other learned professions. But all concerned should be made aware that we *do not come* empty handed and *will not come* cap in hand. For we who require that our College shall continue to frame our curriculum, control the examination of our students, and keep the key of the one door of entry of our graduates, this election is of great moment. Let no one imagine it will be a "walk over," for there are serious dangers ahead. Our opponents are known to be working hard, and we have had a sample of some of their methods in the recent notorious memorandum. To date they appear to have nominated eight candidates for the eight seats, which is good tactics, whilst so far we have 14 in the field, a manifest weakness of vital importance. Reports say that three are willing to withdraw, and it is greatly to be hoped an equal number will have followed this unselfish example in time. The other great danger lies in the deplorable fact that in many past elections only one in four of our members troubled to vote at all. Such apathy can never be excusable; this time it can be disastrous. When the Addresses of candidates are published on the 19th inst. members will surely expect a clear statement from each as to where he or she stands on the one question at issue, and give no one the "benefit of the doubt." Let us strengthen the hands of our Council by returning members pledged to uphold the integrity of our College, if and when future negotiations occur. In any case,

VOTE, VOTE, so that the will of the whole profession may be made manifest.

Yours faithfully,

Sandy Lane, Prestatyn, N. Wales. E. P. EDWARDS.
May 7th, 1945.

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VETERINARY EDUCATION

Sir,—From contacts I have recently had with young veterinary surgeons, and fourth year students, I make the following suggestions.

That all students at all colleges before taking their diploma, should have three short lectures pointing out how they can best use their diploma as a means of livelihood.

In these there should be indicated the various careers open to them in our calling, *e.g.*, Colonial practice, the Ministry, agricultural and general practice, small-animal practice, town practice, research.

The various kinds of competition and opposition they will have to meet and deal with should also be pointed out to them. Examples are, animal societies, charities, unqualified practitioners.

At the present time young graduates enter the outside world with little knowledge of what they will have to face. They should be told the truth about the difficulties and what is expected from them to maintain the great record of their profession; that they will not, like men in trade, be given regular hours and regular holidays; that they must look on their future career almost as a religion, since their main object after assuring themselves a competency, should be to render service to farmers, animal owners and the community; and that they cannot hope for the glittering prizes that would be open to them in other walks of life.

This would instil into them a sense of the responsibility they are about to assume.

Yours faithfully,

Woodcote, Pound Hill, MALCOLM PARK.
Crawley, Sussex.
May 7th, 1945.

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Sir,—It is interesting to learn that the Vice-Chancellor of a university in Northern Ireland has intimated that if at any time it is proposed to establish a veterinary college within it, he is prepared to give it *full faculty status*.

One of the criticisms that could be levelled against the Loveday Committee is its apparent failure when meeting the representatives of the interested universities, to have made it quite clear, and insisted, that under no circumstances would their participation in our education be entertained, unless they were prepared to extend to it the same status and privileges enjoyed by other sciences already established within them. It is not a private affair, but one of national importance, and those who undertake it must realise that they have a public duty to perform. I, for one, will never consent to our education being subordinated to, or absorbed into, another faculty or department.

The Second Report of the Loveday Committee is a summary of recommendations. It is not a collection of edicts. The business of the Committee was to enquire into the subject and to report. This it has done, and it is now open to discussion; and if this fact is recognised, and the report reviewed in this light, then a solution acceptable to all should not be impossible.

Imbued with a spirit of progress, the younger generation in any sphere of human activity is not going to be put off by blind adherence to tradition or to the continuance of systems which experience has shown need revision. In our case, the recent communication from "1944 Graduate" exemplifies it. But it has to be remembered that the choice at present given to those who have to appoint our examiners is limited and difficult. It does not follow that an authority in any one subject is also a good examiner. The experiment of extending *invitation* instead of *advertising for applications* is still untried. The wisdom of appointing any examiner over a period of years is questionable. In due course, students as a rule get to know his whims and idiosyncrasies and which few will deny, are an asset to them—but is this beneficial to the profession? If instead of depriving the Council of the R.C.V.S. of what I regard as our sheet anchor of independence, it is given the additional powers which the Loveday Committee advise, then it will exercise control over the instruction given, and the standard of examination set by *any of the selected examiners*. Then if failure occurs the fault will lie with the veterinary profession. A speedy and just solution of the relatively minor difficulties presented by the recommendations in this Report is desirable, and can be attained, if all parties realise their responsibilities towards those who are to follow us into the profession.

Yours faithfully,

"Rothiemurchus," J. F. D. TUTT.
St. Cross, Winchester.
May 9th, 1945.

THE PRACTICE OF DOCKING

Sir,—I have waited in the hope of a protest from our members in respect of "docking": I thank Mr. F. B. Edwards for his letter published in the *Record* of April 28th. It is adding insult to the injury to the subjects to expose them to unqualified persons.

In the course of a long and varied career I have docked and castrated many animals without anaesthesia; I now have the disturbing memory of the pain and suffering for which I have been responsible. However, I have the satisfaction of knowing that more than 25 years ago I realised the senseless, cruel and inartistic practice of docking horses, except where surgical interference was indicated, and would not castrate any animal other than young kittens without the use of anaesthetics. I lost many cases and a few clients, but in most cases the owners were in full agreement with my view. I look on the docking of very young pups as the lesser evil in the case of those classed as pets, for the reason that it saves the many cases of injury that one encounters in town practice.

I earnestly hope that the whole profession will take a firm stand in this matter and emphasise the protest against the "right" of unqualified persons to perform any surgical operation.

Yours faithfully,

The Willows Bungalow, R. F. WALL.
Maidenhead Road, Windsor.
May 5th, 1945.

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OUR DUMB FRIENDS' LEAGUE

Sir,—With the end of the war in Europe and a finish of all Civil Defence duties, Our Dumb Friends' League will cease its connection with the National Air Raid Precautions for Animals Committee, and with the registration of animals. The League, of course, will continue to the best of its ability to serve the needs of animals at its various hospitals and branches.

Yours faithfully,

Our Dumb Friends' League, E. KEITH ROBINSON.
Grosvenor Gardens House,
Victoria, London, S.W.1.
May 14th, 1945.

R.C.V.S. Council Election

Addresses of Candidates

TO THE FELLOWS AND MEMBERS OF THE ROYAL COLLEGE OF VETERINARY SURGEONS:

Ladies and Gentlemen,—The profession has good reason to be proud of its progress during the past 100 years, progress made and maintained with little outside help, depending entirely on those great men whose courage and devotion were an inspiration to their colleagues. The profession to-day is equally determined to continue that progress.

Veterinary education will always assume an important place in our discussions, for as our knowledge increases or conditions vary, changes will be essential. I do not believe that the profession is adverse to a closer association with the universities or that the present is an unsuitable time for discussion but insist that the decisions arrived at must be acceptable to the profession as a whole.

The memorandum recently published in the *Record* is an amateurish attempt at political wangling, and the thin excuses made for its non-presentation to the profession did nothing to vindicate it.

While there is much good in the Loveday Report it is to be regretted that the representation on the Committee was so weak on the veterinary side. It failed to include a veterinary surgeon with any real knowledge of the conditions and difficulties met with in agricultural practice to-day in this country, and was therefore poorly equipped to assess evidence and make authoritative suggestions for clinical teaching.

While I believe that much must be done to improve veterinary education, both academic and clinical, I submit that the profession must be governed by veterinary surgeons.

Blandford, Dorset. F. BECKETT.
May, 1945.

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TO THE FELLOWS AND MEMBERS OF THE ROYAL COLLEGE OF VETERINARY SURGEONS:

Ladies and Gentlemen,—In making this appeal for your support, I can claim a long experience of the profession and close acquain-

tance with its practitioners of all sections in many different parts of the country. In a period which has seen profound changes the profession has made astonishing progress and has got round several dangerous corners with credit to itself and benefit to the community. This has been brought about by the genius which is within the profession itself, and there is no reason to suppose that genius to be exhausted.

I am quite aware that advantages might accrue from closer collaboration with the universities and, if these can be gained without the sacrifice of our one-portal system and the right of self-government by a freely elected council, then collaboration is to be welcomed. How far we might go by way of compromise depends very largely on the attitude of the universities themselves. It should be made quite clear that we do not enter into negotiations as abject mendicants but as a body conscious of great traditions and high achievement.

There are other highly important issues before the profession: I do not believe that anyone should be bound by a complete confession of faith in regard to these—some freedom is necessary in order to meet changing conditions—but if elected I shall do my best in all ways to further the progress and uphold the dignity of our profession.

Bath. ESMOND BROWN.
May, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—In offering myself as a candidate at the forthcoming Council election I do so with a deep sense of the responsibility which will rest with the Council of the immediate future for the welfare of our profession and it is due only to the fact that for almost 20 years I have practised our profession in turn as an assistant in practice, a Municipal Veterinary Officer, a County Veterinary Officer, a Divisional Inspector of the Ministry of Agriculture, a county practitioner and now as a teacher, and for some years also as an examiner of the Royal College, that I modestly claim to know at first hand some of the wishes, aspirations and difficulties of my colleagues in most branches of the profession.

I count myself among those, fortunately the greater number of my colleagues, who have sufficient pride in our profession to be willing to fight for its independence and who are not prepared, no matter how large the financial inducements or the promises of mythical social advancement, to hand over to any other body the power now possessed by our governing Royal College. The system of education, admittance into, and government of the veterinary profession which during one century has raised it to its present honoured position, and which has produced men such as those whose deaths we have recently had on too many occasions to mourn, must not be exposed to disruption. If such a system needs revision and improvement we ourselves can effect those changes without the dictation of those who see in us another profession to "protect."

We do not spurn the friendship of any, and if the universities wish for our closer co-operation few of us would deny it to them if we can be assured that co-operation will not lead to subservience. No pact must be entered into which is not of distinct advantage to the power which we, through our Royal College Council and its labours through the years, have built up, and if any wish to participate in the harvest which has grown from the lonely furrow ploughed by our forefathers unaided by the universities at a time when help was so badly needed, they must do so on our terms only.

From these few remarks, Ladies and Gentlemen, you will, no doubt, judge whether I sufficiently represent the wishes and interests of the profession to qualify me for a seat on the Royal College Council.

Streatley, Berks. HAROLD BURROW.
April, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—In submitting myself for re-election to the R.C.V.S. Council I wish to state that I stand for a progressive policy in all veterinary matters including veterinary education.

I support the Loveday Committee's proposals whilst realising that it may not be possible to bring all of them fully into effect in the immediate future. The changes they suggest will, in my view, be to the lasting advantage of the profession and of the nation. I have little doubt that if our leaders of a century ago, who had vision to sponsor the Charter, were here to-day, they would be quick to urge us not to be bound by the past any more than they were, but to show vision in our turn.

"We live in a moving, developing world. Let us move with it."

Weybridge. T. DALLING.
May, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—In asking for your support at the forthcoming election I may say that I have been a member of Council since 1934, and I have endeavoured to serve the profession to the best of my ability.

I am determined to uphold the one-portal system granted to us by Royal Charter whereby we control the entry into our profession, and nothing must be done to diminish the power the R.C.V.S. holds of examination and registration. I appreciate fully the value of university collaboration, and the Royal College has been and is always prepared to co-operate as fully as possible with universities with regard to veterinary education. To suggest, however, that universities cannot undertake veterinary education unless they are permitted to confer registrable degrees, is a doctrine to which I cannot subscribe. When the universities have had a wide experience of veterinary teaching, and when we know what status veterinary science will occupy within the universities themselves, then will be the time to consider such a possibility. By all means let the R.C.V.S. grant exemptions in pre-clinical and other subjects to university students who have passed equivalent examinations, but such students must pass a final examination prescribed by the R.C.V.S. in order to be eligible for registration.

I would ask each member to consider carefully and vote upon the issue which lies clear before us: "Shall we or shall we not maintain a portal of entry which is entirely under the control of the profession?" There should be no doubt about the answer.

West Bromwich. H. W. DAWES.
May, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—I have been asked to allow my name to go forward as a candidate for election to Council, R.C.V.S. I am very sensible of the honour inferred and after much consideration I have agreed. I am convinced the profession is rapidly approaching a crisis in its affairs and that momentous decisions will have to be taken. Until we can foresee the future more clearly I consider we should "hasten slowly." From his training and vocation I believe there is no one more capable of arriving at a sound decision than the veterinary practitioner and I hope therefore he will be truly represented in the Council. If further honoured by election it would be my earnest endeavour to uphold the power and dignity of the R.C.V.S. and to interpret the wishes of the electors and act accordingly.

Northampton. J. J. DUNLOP.
May, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—I am highly honoured to be a candidate at the forthcoming Election to the Council of the R.C.V.S. Our profession is passing through a period of great trial. It is being assaulted from without and from within our ranks. I am confident that those who may be placed within the latter category represent only a small minority. Our right to conduct our own affairs, and therefore our cherished independence of thought and action, is in danger. I am proud of my profession, its traditions and its record of service. I am confident that whatever may be the calls of the future, the profession can and will meet its obligations with a stout heart and without, or, indeed, in spite of, the gratuitous advice and control of those who, despite their confessed ignorance, would seek to bend us to their will.

If I am honoured by being elected I will exert every effort to preserve intact the rights and privileges of the profession as vested in the R.C.V.S., and to confound the self-appointed arbiters of our destiny. This task is, to my mind, the crucial one of the moment. In other matters I promise to spare neither time nor effort in service to our College and to the profession, so that we may hand on our great heritage untarnished to those who may follow.

Hove, Sussex. H. SCOTT DUNN.
April, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—In seeking re-election to the Council, R.C.V.S., I venture to ask for a renewal of your support.

The future status of the profession depends, in large measure,

on the upholding of the College by its members and the decisions taken by your Council in the immediate future may have far-reaching consequences.

It is my belief that the Divisions of the N.V.M.A., whilst welcoming collaboration with universities, have given unmistakable evidence of their conviction that the R.C.V.S. is the body which alone is qualified to control entry to the profession and have categorically rejected the principle of university registrable degrees.

I consider that the R.C.V.S., whilst refusing to shirk its duty to decide upon the fitness of entrants to the profession, has adopted a fair and conciliatory attitude in its approach to the problem of increased participation of universities in veterinary education. Given goodwill on both sides there is every reason to hope that improvements in our educational system can be effected partly within the framework of university teaching without abandoning the principles underlying the one-portal system which, in my opinion, *must be retained* if the profession is to survive as a vigorous and independent body.

Mill Hill. R. E. Glover.

May, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—In putting my name forward again for election to Council, R.C.V.S., I do so without any attempt to emulate some who would inveigle the electorate by soft words and catch phrases.

For ten years I have laboured in the N.V.M.A. without regard to my personal comfort or my pocket. I have made many mistakes, and have said unwise things from time to time. My policy has, however, always been the same, to achieve the best I could for the profession under the given circumstances. In short that policy which in the East is called the "Middle Way," and in Great Britain is called the "British genius for compromise." To take the best that opposing schools of thought have to offer, and weld them into the completed whole, is no bad goal for any politician. In the event of my election it is in this spirit that I shall continue my labours for the profession.

Beaconsfield. R. C. G. Hancock.

April, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—I am honoured by being nominated a candidate at the forthcoming election to the Council of the R.C.V.S.

At the present time the profession is at one of the most critical periods in its life. In one hundred years we have had the good fortune to be in the position of being able to regulate our own affairs. During that time great progress has been made to the benefit not only of the profession but also of the nation. This progress has been made by the profession itself. Now, when there are ever increasing prospects, new moves are being made by interested bodies to try and sabotage our Alma Mater, and the R.C.V.S., and incidentally the independence of the profession. This we must resist with all our might, whether the attack be insidious or direct, or from within or without.

I come of a family deeply rooted for many generations in the profession and therefore can claim to have a reasonable knowledge of its work and tradition. In offering myself to the electorate, I state that I stand loyally behind the R.C.V.S. and the one-portal system of entry to the profession and, if elected, I will do my utmost to see that these things are passed intact to those that follow us. All other factors, political or professional, are insignificant when compared with this, the major issue of the moment.

If I am honoured by your confidence it will be my endeavour to give loyal and conscientious service to the Council and to my professional brethren in whatever sphere they may serve.

Sleaford, Lincs. Tom Hicks.

April, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—The issue before the profession is the future status of our *governing body*. *Is it to remain in truth* OURS?

Is the Council of the R.C.V.S. to retain the constitution and exercise control as granted by Charters and Acts of Parliament? Or is it to be fettered by inclusion of nominees from outside bodies? And is it, too, to have its powers diminished by being no longer recognised as the sole institution to be entrusted with the *examination* of candidates for the QUALIFYING REGISTRATION?

The strains and stresses of war have disclosed the needs that are required for all scientific teaching. It would now appear therefore that there will be made available largely increased grants from the Treasury. It is imperative that veterinary science shall be included in such grants.

Are those grants to be handed over to those who have in the past founded our educational system and have raised it to its present position? Or, are the grants to be handed over to the untried and the unknown without experience?

If elected I will use my uttermost effort to support the Royal College in maintaining all its powers and privileges, especially as to remaining the sole authority empowered to confer a legal qualification to practise the art and science of veterinary medicine and surgery, being as it is, in my judgment, the only body really competent to do so.

Llanelly. J. Campbell Hill.

April, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—It is in the belief that the present time is a vital one in the progress of the profession that I have accepted nomination for election to Council, R.C.V.S., this year.

The question of the future education of the profession is one which must inevitably be decided shortly, and it is upon this issue that I solicit your support. The publication of a "Memorandum upon the Proposed Further Participation of the Universities in Veterinary Education," of which I am a sponsor (*Vet. Rec.*, March 24th, 1945), and of the Central Veterinary Society's discussion on the Loveday Report (Supplement to *Vet. Rec.*, March 31st, 1945) renders it unnecessary for me to detail my views upon this matter. Suffice it to say that I am a firm believer in the necessity for the participation of universities in veterinary education and that, should I be elected, I should do all in my power to facilitate progress to that end.

It is clear from the published discussions of Council, R.C.V.S., that whilst many councillors are nominally in favour of this step few are prepared to enter into free negotiation. Despite repeated assertions to the contrary it is undeniable that there has been a considerable modification of professional opinion upon the Loveday Report since the last election and to obtain a Council truly reflecting current opinion a more even balance between the two schools of thought would seem to me essential.

Finally, it may be that the recommendations of the Chancellor Committee will have repercussions necessitating greater consideration of some aspects of small-animal practice than has been the case of recent years. As a small-animal practitioner I might hope to assist such discussions should occasion arise.

Finchley. Joan O. Joshua.

April, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—I have the honour to present myself for re-election to the Council, R.C.V.S., after two years' service.

As a practitioner, I feel that our proportional representation on the Council is of vital importance in the years that lie ahead.

The war years have revealed a wide vista of opportunities opening up to our profession which must be seized during the post-war era.

At this election, the profession must again give its mandate to the Council, R.C.V.S., on the report of the Loveday Committee.

I welcome the recommendations that veterinary education should be closely linked with that of the universities, but consider it most important that the status of a faculty or its equivalent should be granted. I still hold the view that the licence to practise must remain in the hands of the Royal College by at least an adequate control in the final examinations.

The report of the Committee on "Veterinary Practice by Unqualified Persons" lies before the profession. The conclusions reached by this independent body of opinion will be welcomed as a means of stamping out unqualified practice in the years to come.

To the profession of to-day it entails a considerable sacrifice, but to those who follow a freedom for veterinary science that will bring fuller recognition of its status and value to the nation.

Huddersfield. W. R. McKinna.

May, 1945.

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To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—Prior to acceptance of nomination, I satisfied myself that it would be possible for me to accept the heavy responsibilities and carry out to the full the duties which devolve on a member of the Council of the Royal College of Veterinary Surgeons.

My general experience and my period of membership of Committees and of the Council of the N.V.M.A. have been a good apprenticeship for service in the Council of the R.C.V.S. I am prepared at all times to base my actions on this experience and on my reading of professional opinion, in a determination to see the good of the community and the position and dignity of the profession upheld and advanced.

Many of the electorate wish to know candidates' views on current educational problems. I am anxious that veterinary education be of university status and the Memorandum which Major Pugh presented [*Veterinary Record* Supplement. (1945.) **6.** p. 108] is just the type of approach which I would wish to support. I am satisfied that the existing arrangements for education and examination must be overhauled in the near future. I cannot see the desired level of improvement being brought about in any way other than by an arrangement with the university authorities whereby what is good in the two systems is given full opportunity. Had I been a member of the Council when it met on October 14th, 1944 [*Veterinary Record* Supplement. (1945.) **6.**] I would have supported the motion which Mr. Nairn made on that occasion.

Beckenham. R. F. Montgomerie.

April, 1945.

To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—Since 1942 I have filled a casual vacancy on the Council of the R.C.V.S. Staff shortage and difficulties connected with travelling owing to war conditions have prevented me from making as good an attendance at meetings as will be possible from now onwards.

The single issue before the profession is the preservation of the Governing Body.

A strong attack is being made upon it from outside, and, unfortunately, by what is, I feel, an energetic minority in our own profession.

In offering myself for re-election it is my determination to resist any attempt to curtail the existing powers of the R.C.V.S. to register and examine.

Thirty-six years in private practice (with the exception of one year on the staff of the R.V.C. and service in the R.A.V.C. in the last war) together with 16 years' experience as an examiner for the R.C.V.S., have given me first-hand opportunities to ascertain the needs of veterinary education.

During this present time of uncertainty with the necessity of adjusting our outlook to changed conditions, it is essential that we maintain solidly the integrity of our profession. This I am certain can only be achieved so long as our Governing Body remains fully representative of the profession and is elected entirely by the voices of our fellows and members.

Penzance. S. J. Motton.

May, 1945.

To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—I seek your support for my re-election to the Council of the Royal College of Veterinary Surgeons.

Firstly, I am a general practitioner. The representation of general practitioners on the Council is completely inadequate and when one compares the number of veterinary surgeons who earn their living as general practitioners to the number engaged in other branches of professional activity, it is obvious that the general practitioners should have a very much larger representation on Council than they have done in the past.

Secondly, I am a North Countryman and I appeal to my fellow Northerners for their support to obtain a better geographical representation. So often conditions in the Midlands, the South and the West are vastly different from those existing in the North, yet those of us who work in the North of England and in Scotland are represented by a very tiny minority of the Council.

And lastly, the question of the Loveday Report. I consider the advantages to the profession if this report be accepted to be worth the sacrifices we will have to make; the recent report of the Committee on unqualified practice is an example, and, providing that the Royal College is given powers to ensure for all time that the clinical teaching, the standard of examinations and the status of the veterinary student within the universities can be safeguarded by it, then the report should be accepted.

Durham. John D. Peele.

May, 1945.

To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—I beg to offer myself as a candidate for election to the Council of the Royal College of Veterinary Surgeons. Having lived and worked abroad for more than 20 years I can claim knowledge of the conditions of overseas service, in which I have always taken the greatest interest.

Since returning to this country in 1924, I have been in close touch with all branches of the profession, having worked both in England and Scotland, and as I have served on the Council of the Royal College, I can claim some knowledge of its work.

Regarding the vexed question of the Loveday Report, while I am strongly in favour of increased education through the universities and welcome many of the proposals, I am not as yet convinced that it would be a wise policy to alter our one-portal system without much stronger guarantees than those suggested. Certainly, special veterinary faculties at universities should be insisted on.

I am still unconvinced that the profession can for long usefully absorb 220 new graduates yearly and, therefore, can see no reason for the formation of two new teaching schools as is proposed.

I consider that immediate action is called for to mitigate the evils of unqualified practice and welcome the findings of the Chancellor Committee as a basis for such action.

Should I be elected I will always do my best to further what I consider to be the true interests of the profession as a whole.

Edinburgh. D. S. Rabagliati.

April, 1945.

To the Fellows and Members of the Royal College of Veterinary Surgeons:

Ladies and Gentlemen,—Veterinary education is a subject of major consideration at the present time and I am offering myself for election to Council, R.C.V.S., as a supporter of participation of the universities in veterinary teaching on the lines proposed by the Loveday Committee. I believe this to be in the best interests of the profession.

The change from tradition is a big one, and the view that the R.C.V.S. and colleges, having shouldered the burden in difficult days, should now be adequately financed but otherwise left alone, is attractive. We must face the fact, however, that the present trend is for public money for purposes of higher education to go through university channels and that increased funds are unlikely to reach us by any other route. This is quite apart from the real advantages, educational and of public status, which would, I believe, accrue through close university association.

We have to safeguard our interests and those of the public we serve, but they are not in danger and we should no longer hesitate to go forward and make the change which will most assist our future progress.

I have here confined myself to educational matters, but am sensible of the many other important activities of Council, R.C.V.S., and shall, if elected, do all in my power to serve the profession.

Weybridge. A. W. Stableforth.

May, 1945.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Apr. 1st to Apr. 15, 1945...	3	4	1	—	54
Corresponding period in—					
1944 ...	12	4	—	2	29
1943 ...	17	—	1	7	29
1942 ...	14	—	3	7	13
Total Jan. 1st to Apr. 15, 1945	37	63	4	33	331
Corresponding period in—					
1944 ...	75	19	5	58	181
1943 ...	108	10	5	92	168
1942 ...	95	11	26	98	123

Note.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Tuberculosis Order of 1938

The number of bovine animals slaughtered under the Tuberculosis Order of 1938 during the period January 1st to March 31st, 1945, was 2,640.